

DEPT. OF FISHERIES

COMMERCIAL FISHERIES *Review*

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COVER: A shrimp catch being landed aboard the charter vessel M/V "Yaquina" in Yakutat Bay, Alaska.

COMMERCIAL FISHERIES

Review

A comprehensive view of United States and foreign fishing industries--including catch, processing, marketing, research, and legislation--prepared by the Bureau of Commercial Fisheries.



FISHERMEN'S MEMORIAL--GLOUCESTER, MASS.

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Landing a yellowfin tuna aboard a research vessel in the Indian Ocean. (Photo: Richard S. Shomura, BCF Biological Laboratory, Honolulu, Hawaii.)

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1966 WAS A GOOD YEAR FOR U. S. FISHERIES

United States fisheries had a good year in 1966. The shrimp fishery became the first to approach the \$100 million level. Tuna prices reached new highs at the beginning of the year. The salmon catch was one of the largest and best balanced in recent years.

On the other side of the ledger, the small menhaden catch was the biggest disappointment. (But the North Carolina fall menhaden fishery was good.) The low scallop prices and the reduced catches during the last part of 1966 made for a poor scallop fishery.

The year 1966 ended with prices received by fishermen about 16 percent above the 1957-59 average, seasonally adjusted. In comparison, the index of prices received by farmers for meat animals was up about 12 percent.

Annual dockside (exvessel) prices, on average, had remained quite stable from 1956 to 1964. In 1965, exvessel prices for both shellfish and finfish jumped about 8 percent over 1964; in 1966, they rose another 7 percent. The 1966 index of shellfish prices was 112 percent of the 1957-59 average; the same index of finfish was 116 percent.

Shrimp Prices Rose But Other Shellfish Prices Fell

Shrimplers all species with prices 124 percent of the 1957-59 average. The 1965 index of exvessel shrimp prices was only 103. This means exvessel shrimp prices increased about 21 percent from 1965 to 1966.

The average prices for other shellfish--including blue crabs, hard and soft clams, Northern lobsters, Eastern oysters, and sea scallops--were 103 percent of the 1957-59 average--a drop of 12 percent from 1965. Practically all of this drop was due to the drastic decline in scallop exvessel prices. Scallop prices were about 5 percent below the 1957-59 average. This was due almost entirely to the record scallop stock levels at the beginning of 1966.

The 1966 wholesale prices of industrial fishery products are 20-30 percent above the 1957-59 average but only about 5 percent above the 1965 level. The good world demand for both fish meal and fish oil has maintained these prices.

New England Finfish Prices Climbed 20%

New England finfish prices in 1966 were 18 percent above the 1957-59 average. Included in this group are the cod, flounders, haddock, and ocean perch. This was a 20 percent increase over the 1965 exvessel New England finfish price.

The exvessel prices of Pacific salmon have been quite stable in the past 2 years. The price indexes for 1964, 1965, and 1966 were 111, 110, and 113, respectively, with 1957-59 equalling 100.

Unlike salmon prices, there has been considerable fluctuation in exvessel tuna prices in the past couple of years. Included in the tuna group are the albacore, bluefin, skipjack, and yellowfin. The 1966 tuna prices will average about 120 percent of the 1957-59 average. This is an increase of about 20 percent over 1965 prices and 25 percent over 1964 prices. This annual index obscures the fact that prices during the first 3 months were 30 to 45 percent above the 1957-59 average.

Exvessel, Wholesale and Retail Prices Generally Move Together

In most U. S. fisheries, the exvessel price fluctuates more on a percentage basis than do wholesale or retail prices. The processors and retailers estimate what price they can obtain for the current volume and subtract their costs to determine the price they can afford to pay the fishermen. The exvessel value becomes the residual value after the processing and marketing costs are deducted. While marketing margins do vary slightly from month to month, exvessel, wholesale, and retail prices generally move up and down together. (BCF Branch of Current Economic Analysis.)



UNITED STATES

Industrial Fishery Products

FISH MEAL SUPPLY IS UP 13.1%,
SOLUBLES DOWN 14%

Based on domestic production and imports, available supply of fish meal in the United States for the first 10 months of 1966 was 548,549 short tons--63,411 tons (or 13.1 percent) more than during the same period in 1965. Domestic production was 53,220 tons (or 24.1 percent) lower, but imports were 127,315 tons (or 50.1 percent) higher than in January-October 1965. Peru was the leading source with shipments of 239,323 tons.

U. S. Supply of Fish Meal and Solubles, January-October 1966			
Item	Jan.-Oct.		Total 1965
	1966	1965	
. . . (Short Tons) . . .			
Fish Meal and Scrap:			
Domestic production:			
Groundfish	8,954	9,797	10,696
Herring	10,690	12,340	12,932
Menhaden 1/.	113,952	161,403	175,959
Tuna and mackerel	25,594	21,389	25,399
Unclassified	8,047	15,528	17,360
Total production 2/	167,237	220,457	242,346
Imports:			
Canada	38,833	36,866	43,830
Peru	239,323	204,841	209,801
Chile	69,904	5,201	5,651
Norway	18,954	49	78
So. Africa Rep.	6,040	2,900	5,100
Other countries	8,258	4,140	6,206
Total imports	381,312	253,997	270,666
Available fish meal supply	2/ 548,549	485,138	524,717
Fish Solubles 3/:			
Domestic production	74,774	87,637	94,839
Imports:			
Canada	1,223	1,293	1,488
Peru	1,941	1,504	2,598
Mexico	351	207	227
Other countries	360	825	825
Total imports	3,875	3,829	5,138
Available fish solubles supply	78,649	91,466	99,977

1/Includes other species.

2/Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

3/Wet-weight basis except for imports from South Africa Republic (included in "other countries").

Source: BCF and U. S. Department of Commerce, Bureau of Census.

1/Includes other species.

2/Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

3/Wet-weight basis except for imports from South Africa Republic (included in "other countries").

Source: BCF and U. S. Department of Commerce, Bureau of Census.

The U. S. supply of fish solubles during January-October 1966 was 78,649 tons--down 14.0 percent from the 1965 period.

Domestic production of fish solubles decreased 14.7 percent, but imports of fish solubles increased 1.2 percent.

FISH MEAL, OIL, AND SOLUBLES PRODUCTION DECREASES

During October 1966, about 8.7 million pounds of marine animal oils and 10,843 tons of fish meal were produced. Compared with October 1965, this was a decrease of 777,000 pounds of marine animal oils and 1,478 tons of fish meal and scrap. Fish solubles production was 5,588 tons--a decrease of 1,091 tons from October 1965.

U. S. Production of Fish Meal, Oil, and Solubles, October 1966/ with Comparisons				
Product	Oct.		Jan.-Oct.	
	1/1966	1965	1/1966	1965
. . . (Short Tons)				
Fish Meal and Scrap:				
Groundfish	983	450	8,954	9,797
Herring	896	718	10,690	12,340
Menhaden 2/	6,246	7,036	113,952	161,403
Tuna and mackerel	2,718	2,680	25,594	21,389
Unclassified	-	1,437	8,047	15,528
Total 3/	10,843	12,321	167,237	220,457
Fish Solubles:				
Menhaden 2/	4,405	4,197	56,197	68,865
Unclassified	1,183	2,482	18,577	18,772
Total	5,588	6,679	74,774	87,637
. (1,000 Pounds)				
Oil, body:				
Groundfish	198	132	1,456	2,270
Herring	442	386	7,046	8,171
Menhaden 2/	7,170	7,333	123,685	165,778
Tuna and mackerel	870	711	4,452	3,993
Unclassified (inc. whale)	-	895	4,178	3,929
Total oil	8,680	9,457	140,817	184,141

1/Preliminary data.

2/Includes a small quantity of other species.

3/Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

Source: BCF.



Imports of Fish Meal and Scrap Rose 50%

Imports of fish meal and scrap during the first 10 months of 1966 were 50.1 percent higher than the 1965 period.

U. S. Imports of Fish Meal and Scrap by Principal Areas ^{1/}		
Area	January-October	
	1966	1965
 (Short Tons)	
Maryland	76,219	52,160
Georgia	72,937	39,773
Mobile (Ala.)	75,221	48,540
Texas	20,584	12,276
Los Angeles (Calif.)	18,376	17,943
San Francisco (Calif.)	49,178	33,053
Washington	18,849	18,296
Duluth (Minn.) & Superior (Wis.)	4,373	7,309
Other	45,574	24,617
Total	381,312	253,967

^{1/}Imports were previously shown by Customs Districts; now they are shown by principal areas.



Shrimp Imports Rose Nearly 9%

Imports of all shrimp (fresh, frozen, canned, and dried) from all countries for January-October 1966 were 140.4 million pounds--compared with about 129.4 million pounds for the 1965 period, up 8.6 percent. Imports from Mexico totaled about 50.3 million pounds, an increase of 13.7 percent from the 44.2 million pounds of the 1965 period.



Can Shipments for Fishery Products Increase



During January-September 1966, 2,408,898 base boxes of steel and aluminum were used to make cans shipped to fish and shellfish canning plants. This compares with 2,324,148 base boxes used during the 1965 period.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area of 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by using factor 23.7 base boxes per short ton of steel.

Source: U. S. Department of Commerce, Bureau of Census.



Pacific Coast Canned Salmon Stocks Are 20% Above 1965

On November 1, 1966, the U. S. pack of Pacific canned salmon, including Alaska's, was 4,253,272 standard cases. This was 20.1 percent above the 1965 pack of 3,541,187 cases. By species, the new pack was made up of (1965 pack in parentheses): king, 77,170 standard cases (95,503); red, 1,425,920 cases (2,013,077); coho, 190,866 cases (170,064); pink 2,004,529 cases (951,688); chum, 554,787 cases (310,855).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners who packed over 96 percent of the 1966 salmon pack. (Division of Statistics and Economics, National Canners Association, Dec. 9, 1966.)



Wholesale Prices/Indexes for Edibles, November 1966

From October to November 1966, wholesale prices were lower for several principal items: haddock, fresh and frozen fillets, shrimp, and canned salmon; rose for others, and were unchanged for some. At 125 percent of the 1957-59 average, the overall wholesale price index for edible fishery products in November dropped 4.8 percent from October. Compared with November 1965, November 1966's index was 4.7 percent higher because most products were generally higher.

Lower prices at Boston for ex-vessel large haddock, down 29.8 percent from October to November, were largely responsible for 11.2-percent drop in November's subgroup index for drawn, dressed, or whole finfish. In New York City, prices were lower for frozen king salmon and Great Lakes fresh yellow pike, but slightly higher for frozen western halibut. Compared with November 1965, prices were sharply lower for haddock (down 19.7 percent) and yellow pike (down 16.2 percent) because of better supplies, and slightly lower for king salmon (down 1.7 percent). As a result, the subgroup index was down 5.8 percent from the 1965 month.

The processed fresh fish and shellfish subgroup index dropped 7.6 percent from

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, November 1966 with Comparisons								
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1967-59=100)			
			Nov. 1966	Oct. 1966	Nov. 1966	Oct. 1966	Sept. 1966	Nov. 1965
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					125.0	131.3	131.4	119.4
Fresh & Frozen Fishery Products:					126.5	136.1	137.0	122.7
Drawn, Dressed, or Whole Finfish:					121.0	136.2	136.8	128.5
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.15	.21	115.2	134.0	114.5	143.4
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.47	142.0	139.0	142.0	140.5
Salmon, lkg, lge. & med., drsd., fresh or froz.	New York	lb.	.86	.93	120.2	129.6	139.7	122.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.63	.62	93.3	91.8	123.1	86.8
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.65	.67	106.4	108.9	143.2	126.9
Processed, Fresh (Fish & Shellfish):					127.6	138.1	137.6	124.2
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.47	.54	114.2	131.2	109.3	115.4
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.03	1.12	120.1	131.2	130.1	106.6
Oysters, shucked, standards	Norfolk	gal.	8.25	8.75	139.1	147.5	151.8	147.6
Processed, Frozen (Fish & Shellfish):					125.1	128.6	132.0	110.9
Fillets; Flounder, skinless, 1-lb. pkg.	Boston	lb.	.44	.43	110.2	109.0	106.4	108.9
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	117.3	115.8	118.7	117.3
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.30	.32	103.5	110.5	112.2	112.2
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.11	1.16	131.0	137.5	142.3	107.3
Canned Fishery Products:					122.9	123.3	122.0	114.0
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	27.50	28.00	119.9	122.0	122.0	117.7
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.95	12.95	115.0	115.0	115.0	102.6
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.50	8.00	144.1	135.6	135.6	120.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	11.25	11.25	144.3	144.3	131.5	131.5
1/Represent average prices for one day (Monday or Tuesday) during week in which 15th of month occurs. Prices are published as indicators of movement, not necessarily absolute level. See daily Market News Service "Fishery Products Reports" for actual prices.								
Source: U. S. Department of Labor, Bureau of Labor Statistics.								

1/Represent average prices for one day (Monday or Tuesday) during week in which 15th of month occurs. Prices are published as indicators of movement, not necessarily absolute level. See daily Market News Service "Fishery Products Reports" for actual prices.

Source: U. S. Department of Labor, Bureau of Labor Statistics.

October to November 1966 because of lower prices for all items. Prices were down 8.5 percent for South Atlantic fresh shrimp at New York City and 5.7 percent for standard shucked oysters at Baltimore because of very good oyster production. The subgroup index in November 1966 was 2.7 percent higher than November 1965 solely because fresh shrimp prices were up 12.7 percent. Prices for standard shucked oysters (down 5.8 percent) were lower than in November 1965.

Index Down For Frozen Processed Items

Lower prices from October to November for frozen ocean perch fillets (down 6.3 per-



Oyster shucker.

cent) at Boston and frozen shrimp (down 4.7 percent) at Chicago produced 2.7-percent drop in subgroup index for frozen processed fish and shellfish; prices for other species of frozen fillets were slightly higher. The subgroup index rose 12.8 percent over November 1965 because of higher shrimp prices (up 22.1 percent). Prices for flounder fillets were 6.1 percent higher than November 1965; for ocean perch fillets 7.8 percent lower.

The subgroup index for canned fishery products dropped 0.3 percent from October largely because canned pink salmon prices were down 1.7 percent. November prices were 6.3 percent higher for California jack mackerel, and unchanged for other group items. November 1966 prices were substantially higher than November 1965 for nearly all canned fish products; subgroup index was up 7.8 percent. Prices for canned salmon were up slightly. (BCF Market News Service.)



U.S. Adopts 12-Mile Fishery Zone

On October 14, 1966, President Johnson signed into law P.L. 89-658 to establish an exclusive fisheries zone for the United States 12 miles from the baseline from which the territorial sea is measured--9 miles of fisheries jurisdiction beyond the 3-mile territorial sea. Traditional foreign fishing recognized by the United States may continue in this zone.

The enactment of the law means that the United States is not now in a position to contest the right of other nations to similar exclusive 12-mile limits. However, this nation will endeavor to maintain traditional fishing rights that U. S. fishermen may have established in such zones. The United States action has no effect on traditional freedoms of the sea.

As a consequence of the new law, the Fishermen's Protective Act (P. L. 680-83) will no longer cover reimbursement of fines paid by U. S. fishermen following seizures within exclusive fisheries zones up to, and including, 12 miles in width claimed by some countries.



Seashore Damage Blamed for Fish Decline

Coastal fish resources of the Atlantic have reached a "critical condition," according to an annual resource report of the American Littoral Society. The society is a national aquatic conservation group based at the Sandy Hook Marine Laboratory, Highlands, N. J. The report says that much of the scarcity of fish may be due to pollution and the general disruption of the coastal area.

The society used BCF statistics in its analysis. These showed that commercial catches of 18 Atlantic coastal species were down nearly 50 percent from 1960 to 1965--from 1,400 million pounds to 700 million pounds. Major cause of the downward trend was the sharp drop in catches of menhaden; from 1,176 million pounds in 1960 to 530 million pounds in 1965.

Other prime species showed a downward trend on the Atlantic coast from Maine to Florida: fluke, croaker, spot, and porgy; together, they dropped from an index level of

88 to 58 million pounds. These important sport fishes, like the commercial menhaden, may be suffering from lack of good breeding grounds.

Coastal Areas Destroyed

The babies of most coastal species live in the marshes and very shallow waters along the edges of bays and tidal rivers, where they find protection and rich food. In recent years, these areas have been destroyed relentlessly or filled over for house lots, garbage dumps, or industrial sites. Without these sanctuaries, many young perish.

The report says that pollution of coastal bays also is harsh on young coastal fish, conditioned by nature to live in clean shore waters. Fishes migrating along the coast could easily be repelled by the filth pouring into the bays and continue on their way looking for better habitat.

However, sea fish that go up into the fresh waters of coastal tributary rivers for spawning appear to be better off. River spawners showing an upward trend over the 5-year period were river herring and shad, 56 to 72 million pounds. Those showing a slight downward trend were striped bass and white perch, 11 to 10 million pounds.

Bluefish and mackerel increased from an index of 6 to 9 million pounds. These are coastal species whose habitat seems least affected by man's progress.



Fish Diet Reduces Incidence of Heart Attacks

Men who ate fish 5 times a week for lunch and dinner for 5 years suffered only a third as many heart attacks as men in a control group. Hypertension and obesity also were reduced. The fish eaters, 814 men 40-59 years old, were members of a New York "anti-coronary" club who volunteered to take part in a study seeking ways of preventing heart disease. The control group consisted of 463 men of the same ages.

The club members followed a "prudent diet" prescribed by the New York City Department of Health, reports the Department's Dr. Seymour H. Rinzler. They ate much fish,

substituted margarine for butter, sherbet for ice cream, and soft cheeses for hard. Chicken, veal, and lamb were the main meat choices, but one pound of beef or pork was allowed weekly. The rest of the diet consisted of a maximum of 4 eggs a week, one ounce of oil daily, bread, and cereals.

Dr. Rinzler said anti-coronary clubs are starting up in many communities. He cited as examples 5 in New York State, 1 in Chicago, and 1 in Burlington, Vt. (Reprinted, with permission from "Science News," weekly summary of current science, copyright 1966 by Science Service, Inc.)



Inventions

NEW METHODS OF PREPARING AND FREEZING LOBSTERS AND CRABS

A patent was granted recently on a "method of preparing and freezing lobsters and crabs." The method prepares whole lobsters (Atlantic or *Homarus americanus*) for freezing for indefinite storage. Thus, the lobster may be kept for long periods and the meat does not freeze to the shell, which makes it easier to remove on normal thawing. The same method also may be used with other shellfish, such as crabs. (U. S. Patent No. 3,261,693, to Ruth W. Jung, Jung International Food Corp., 217 Broadway, Amityville, N. Y. 11701.)

PROCESS TO EXTRACT RAW MEAT OF SPINY LOBSTER

A patent was granted recently on a "process for extracting raw meat from the shell of the body-section of the spiny lobster." This was formerly discarded as waste because it was difficult to extract under ordinary conditions and temperatures. An important objective of the process is to extract the meat in one piece, in prime condition, and with a minimum of mutilation in order to produce an attractive product for the market.

The manual process is executed with modified simple hand tools. The inventors claim the same process can be used to extract raw meat from the shell of the body-section of the northern or Atlantic lobster. (U. S. Patent No. 3,276,070, to Joseph M. and Frank J. Kaspar, 6750 SW. 8th St., Miami, Fla. 33144.)



Humphrey Visits BCF's Miami Lab

Vice President Hubert H. Humphrey, acting as chairman of the new Marine Resources Council, and Cong. Dante Fascell of Florida visited the University of Miami and BCF's Tropical Atlantic Biological Laboratory on December 8, 1966. BCF Regional Director Seton Thompson and Laboratory Director Thomas Austin greeted the Vice President and staff and briefed them on the Bureau's program in the Gulf and Tropical Atlantic. Thompson emphasized the possibilities of fish protein concentration (FPC). During his visit, the Vice President appeared especially interested in FPC, international cooperation, and the processing and transmission of oceanographic data. From the laboratory the vice-presidential party went on to the docks to tour the "R/V Undaunted."



Lamprey Control Gains, Great Lakes Commission Told

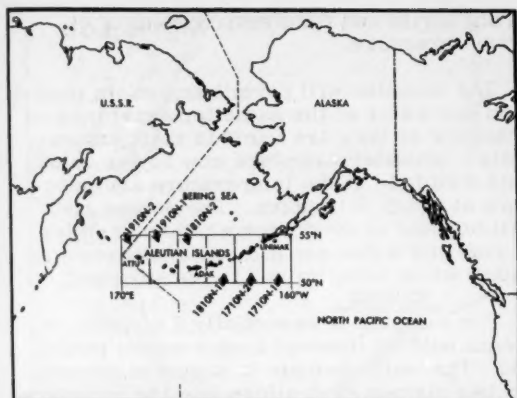
Biologists of the Canadian Department of Fisheries and BCF reported good progress in lamprey control in Lakes Superior, Michigan, and Huron to the recent meeting of the Great Lakes Fishery Commission. Lampreys have been reduced by over 90 percent in Lake Superior and lake trout are thriving. Catch quotas for 1967 have been increased 70 percent over 1966--permitting the harvest of 400,000 pounds of trout.



Oceanography

DISCOVER UNDERSEA MOUNTAINS, RIDGES, AND SEA BASINS IN NORTH PACIFIC

The discovery of uncharted undersea mountains, mountain ridges, and sea basins in the North Pacific and Bering Sea was disclosed on December 27, 1966, when the U. S. Department of Commerce published 6 new maps of the sea floor surrounding the Aleutian Islands. The bathymetric maps were produced by the Department's Environmental Science Services Administration (ESSA).



Diagonal markings show area covered by new Aleutian Island sea-bottom maps.

They cover about 400,000 square statute miles of seabed where thousands of earthquakes are spawned each year. Almost 25 years of work went into their preparation. They were compiled from more than 275 hydrographic surveys by vessels of ESSA's Coast and Geodetic Survey between 1943 and 1964--among them, the "Pioneer," "Surveyor," "Explorer," and "Pathfinder."

The maps cover the seabed adjacent to the Aleutian Islands from Unimak Island on the east to submerged Stalemate Bank, 45 statute miles west of westernmost Attu Island. The area extends from a few miles south of the Aleutian Trench to about 350 statute miles north; it includes the southern portion of the Bering Sea and the submerged mountain range (Bowers Ridge) extending northward into the Bering Sea.

Provides Knowledge About Geologic Forces

The detailed portrayal of submarine topography of the island chain can provide better understanding of the geologic forces shaping the ocean floor in this seismically active area. It will enable seismologists to determine changes in the sea floor resulting from major earthquakes. The maps can prove valuable to scientists in associated disciplines--physical and biological oceanography, geophysics, and commercial fisheries.

Many features, such as the immense Aleutian Trench, are shown in greater detail than before. This trench parallels the arc about 75 miles to the south of the Aleutian Islands and has a maximum depth of over 25,000 feet.

Positions of the soundings within sight of land were obtained by standard visual fixes, positions of offshore soundings were located by electronic positioning devices. Depths were secured with echo sounders that create a continuous profile of the ocean floor.

The six maps, on a scale of 1:400,000, may be ordered by number for 50 cents each from the Coast and Geodetic Survey, Environmental Science Services Administration, Rockville, Md. 20852.

A text describing the shape of the ocean floor in the area covered by the maps is expected to be available early in 1967.

* * *

NAVAL OCEANOGRAPHERS PLANT ACRE OF BUOYS

A team of oceanographers and technicians from the U. S. Naval Oceanographic Office planted "an acre of buoys" about half way between Cape Hatteras and Bermuda. The object is to measure and interpret the dynamic characteristics of the ocean in a small area.

It was planned to take measurements at intervals of 15 minutes to one hour for 6 weeks to 6 months with sensing arrays moored down to 17,000 feet. All instruments are self-recording on either 16mm film or scratch-type strip chart.

* * *

HYDROGRAPHIC SHIP IS COMMISSIONED, A SECOND CHRISTENED

The \$2.4 million survey vessel USC&GSS "McArthur" was commissioned December 15, 1966, at the Coast and Geodetic Survey's Atlantic Marine Center, Norfolk, Va., announced the U. S. Department of Commerce's Environmental Science Services Administration (ESSA).

The 175-foot, 995-ton, air-conditioned ship is built of welded steel strengthened for navigation in ice, propelled by diesel engines with twin-screw reversible-pitch propellers, and equipped with specialized depth recorders and positioning equipment. It has crew accommodations for 36 officers and men.

The McArthur, essentially, is a hydrographic survey ship, but can conduct various

sophisticated oceanographic investigations. Her first assignment, until mid-June 1967, will be gravity measurements on the East Coast between Cape Hatteras, N. C., and Key West, Fla. This is part of a program to determine properties of the continental shelf.



Hydrographic survey ship, USCGC McArthur. Photo: ESSA.

In July 1967, the ship is scheduled to arrive at her home base in Honolulu. She will carry out hydrographic and current surveys, magnetic and gravity observations, and oceanographic research.

A second Department of Commerce hydrographic survey vessel, the \$4.3 million USC&GSS "Mt. Mitchell," was christened November 29, 1966, in Jacksonville, Fla.

The 231-foot, 1,627-ton vessel has a welded steel hull strengthened for navigation in ice; twin-screw diesel engines equipped with reversible-pitch propellers; engine room monitored by centralized automated system; a bow thruster; electronic, depth recording, and positioning equipment; and accommodations for 80 officers, crew, and scientists.

The Mitchell and two sister ships, "Fairweather" and "Rainier," are scheduled to be completed in 1967. They are designed to chart U. S. coastal waters to meet navigational needs, and to conduct oceanographic work on the continental shelves and slopes.

ENVIRONMENTAL SAMPLER CAN HELP UNDERSEA STUDY

A deep-ocean environmental sampler developed by 4 Naval Research Laboratory scientists can take samples at great depths

in any liquid and fluid environment of extreme pressure.

The sampler will permit scientists to study mud and water at the same temperature and pressure as they are found in their natural state. Seawater samplers now in use cannot hold a sample at the temperature and pressure at which it is taken. The device also will be used to determine whether samples of mud and water are altered by depressurization while being raised to the surface.

The sampler is essentially 2 coaxial cylinders with an internal double-ended piston rod. The water sample is captured between the two pistons as it slides into the cylinders under gravitational or spring loading. Patent issued to: Chester L. Buchanan, Jervis J. Gennari, Howard E. Barnes, and Walter L. Brundage Jr. ("Science News," copyright 1966.)

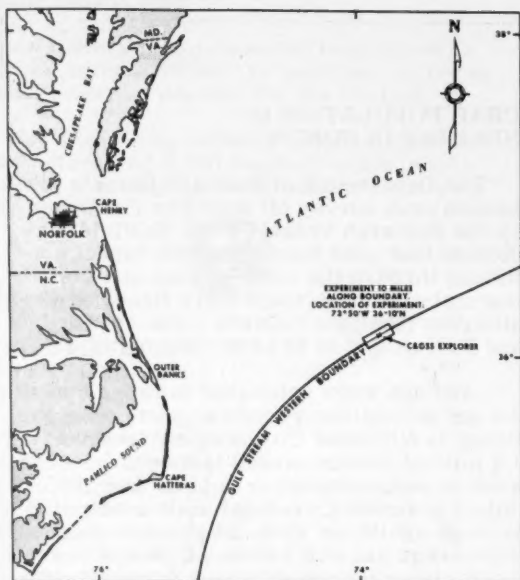
HIGH-SPEED HYDROFOIL BOAT IS SUITABLE FOR OCEANOGRAPHIC WORK

Tests show that it is feasible to use high-speed hydrofoil boats in making echo soundings in hydrographic survey work, reports the U. S. Naval Oceanographic Office. Data analysis indicates that equipment worked favorably in shallow and deep water, over seaweed, rock, and sandy bottom. The speed of the hydrofoil was varied and had no adverse effect on readings.

The echo sounder differs from traditional types used in hydrographic surveying. Instead of relying on measurement of the transit time for single sound impulses, it used a continuous wave frequency modification principle.

STUDY GULF STREAM FROM SEA AND AIR

A 10- by 3-mile section of the Gulf Stream was tested intensively in October 1966 by 3 Government agencies seeking to learn more about the mysterious "ocean river." This was reported last month by the Environmental Science Services Administration (ESSA), U. S. Department of Commerce.



Segment of Gulf Stream where tests were made.

The tests were conducted 150 to 400 miles off the North Carolina coast by the USC&GS Ship "Explorer" of ESSA's Coast and Geodetic Survey, and aircraft of the Navy Oceanographic Office and the Manned Spacecraft Center of NASA.

The results are being processed and studied. The tests are part of a larger study of the Gulf Stream underway for more than a year by 15 governmental and private groups.

The ship and planes communicated constantly by radio. The planes were equipped with aerial cameras, infrared and microwave sensing instruments, and radar.

One instrument was an infrared line scanning image system which photographed the Gulf Stream's western boundary. The instrument records on film small differences in the ocean surface's temperature. The Gulf Stream is warmer than the coastal waters that form its western terminus. The cold water appears lighter on the film than the warmer Gulf Stream, so the Gulf Stream's western limits show up clearly. ESSA believes that if the expected results materialize, the way may be open for showing on film, on a regular basis, both surface boundaries of the Gulf Stream. Although the western border now is known, it keeps changing. The stream's eastern edge is more difficult to identify because the small thermal difference between Gulf Stream and eastern water makes its boundary less distinct. The image system used in the tests may detect the small heat differences and produce useful results.



Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.



STATES

Alaska

UPGRADES SKILLS OF FISHERMEN

The first of two 14-week courses to upgrade skills of fishermen began in Ketchikan on November 21, 1966. The series is being administered by the State Department of Labor under a Manpower Development and Training Act program. The courses are supervised by an extension educator in fisheries of the University of Alaska. Each course includes a practical training period aboard a west coast combination vessel to demonstrate trawling techniques. Personnel of BCF's Ketchikan Technological Laboratory have prepared lectures on fish handling and preservation.

HERRING CATCH IS LOWEST ON RECORD

Only 5,073 tons were taken in Southeastern Alaska in 1966, the smallest on record since 1941. Because the 1941 catch was only an experimental operation, the 1966 catch actually is the lowest recorded since 1929, when recordkeeping began. The catch-per-unit effort during the 1966 season was slightly lower than the average: 0.31 ton per unit of effort compared with a 35-year average of 0.37 ton.



California

ANCHOVY LANDINGS TOTAL 5,200 TONS

About 5,200 tons of anchovy were landed through December 7, 1966, in the 1966-67 experimental anchovy reduction fishery, the Department of Fish and Game reported on December 9.

The experimental fishery, in its second year, was established with a maximum take of 75,000 tons. It opened October 1, 1966, and will close April 30, 1967. The DFG Director is authorized to close the fishery on 48 hours notice if it threatens the resource, or when the quota in any one of the five zones involved is reached.

CRAB POPULATION IS HEALTHY IN NORTH

The Department of Fish and Game's pre-season crab survey off northern California by the research vessel "N. B. Scofield" indicated that crab fishermen can expect good fishing through the 1966-67 season. Commercial-type crab traps were fished at 40 different locations between Crescent City and False Cape in 10 to 33 fathoms of water.

Landings were estimated to range between 6.8 and 8.9 million pounds at ports from Fort Bragg to Crescent City, slightly less than the 9.9 million pounds landed last season. Crabs were in better condition in 1966 than 1965. Only 7 percent of the legal male crabs still had soft shells; in 1965, 20 percent of the legal crabs had soft shells. Crabs also were larger: average weight was 2.4 pounds per crab, compared to 2 pounds in 1965.

1966 IS RECORD YEAR FOR FISH

Several fish and game records highlighted the annual report of Walter T. Shannon, Director, Department of Fish and Game, to the Fish and Game Commission on December 9, 1966:

- Fish hatchery production hit high in poundage and number of fish produced. In fiscal 1965-66, 2,276,895 pounds (63,192,719 fish) were produced, including 27,325,996 trout and kokanee; 35,110,632 silver salmon, king salmon, and steelhead; and 56,091 warm-water fish.

- Both the commercial and sport catch of salmon increased. Commercial landings exceeded 10 million pounds, a near record, and were well above the 10-year average of 7.4 million pounds. In 1965, 9.7 million pounds were landed. Sport salmon landings of 114,000 fish nearly doubled 1965's 61,000 salmon.

- Shrimp landings of 1,230,000 pounds compared to 1965's 1,427,000 pounds. Market crab landings were more than 9½ million pounds, mostly in northern California. In the San Francisco Bay area, landings were under 50,000 pounds, a very low figure. The

California (Contd.):

crab fishery is not expected to improve in 1967. Investigations are underway to try to determine the reasons for the decline.

● "Population surveys indicate about 600 sea otters and 3,090 elephant seals, which means these species are holding their own," Shannon said.



Florida

SCIENTISTS CAN PREDICT EVERGLADES' WATER NEEDS

Fishery biologists at the Institute of Marine Science, University of Miami, have devised a system of predicting the fresh water requirements of aquatic plants and animals in Everglades National Park. Recent serious shortages of fresh water in the Park emphasized the urgent need for biological estimates of water requirements.

In the Park, where most of the priceless plant and animal communities are aquatic or semiaquatic, requests for supplementary fresh-water flow must be made on the basis of biological need. At stake are the multi-million dollar pink shrimp landings of the Dry Tortugas, Florida's most valuable fishery resource, other commercial fisheries, and the rapidly expanding sport fishery of Florida Bay and the 10,000 Islands. Most commercial and sport fishes and shrimps and crabs of the region spend critical months of their life cycle in the brackish water of the Park's estuaries.

The system of predicting biological water need is based on the recently discovered close relationship between ground water levels in the Shark River Valley and the position of lines of equal salinity, called "isohalines", in the coastal estuaries. By measuring ground water elevation above or below sea-level in any one of three wells in the watershed, it is possible to predict salinity in the estuaries throughout an 85-mile area along the south Florida coast--from the Keys to Everglades City. Companion studies have provided information on the kinds and quantities of plants in these coastal estuaries under different conditions of salinity. Thus, the height of water in the test wells warns when salinities are too high. It will tell

authorities when and how much water should be delivered to the park.



Maine

CANNED SARDINE STOCKS DROP

Through December 3, 1966, the year's pack of canned Maine sardines totaled 1,197,000 standard cases, according to the Maine Sardine Council. This compared with 1,227,000 cases packed during the same period in 1965. Bad weather during November was responsible for poor fishing conditions along the coast of Maine.

New legislation permitting year-round canning of Maine sardines removed the traditional December 1 closing date for the packing season. It opened winter canning to all Maine sardine packers--with domestic as well as imported herring.



Michigan

COHO ARE THRIVING

The 850,000 coho (Silver salmon) planted in spring 1966 in one Lake Superior stream and 2 Lake Michigan streams have made "amazing progress," reports the Department of Conservation. The young coho were raised in Michigan hatcheries and planted as 4- to 6-inch fingerlings. Within 3 months, several measuring more than 15 inches and weighing up to 2 pounds had been netted in Lake Michigan. The Department says the coho "promises to be one of Michigan's most outstanding fish."

The fall 1966 run was composed of 2-year-old fish--the "jacks" of the Pacific Coast. The majority of cohos planted in spring 1966 will either be caught in the Great Lakes in summer 1967, or will return in fall 1967 as full-fledged 3-year-old "adults."

Washington State Donates Chinook

The efforts to revitalize the Great Lakes fishery was aided by a Washington State donation to Michigan of more than 1,000,000

Michigan (Contd.):

chinook, or king salmon eggs. Fingerling chinooks hatched from these eggs will be planted in spring 1967 in a stream that has not yet been selected.



Oregon

DUNGENESS CRAB OUTLOOK IS GOOD

The Fish Commission reported an extremely good outlook for the 1966-67 Dungeness crab season. It opened December 1, 1966, and runs through August 15, 1967, in the Columbia River and Pacific Ocean. This season's harvest is expected to equal the 1965-66 catch of more than 10 million pounds. The average annual landings over the last 20 years has been 7 to 8 million pounds.

Due to the August 16-November 30 closed season, the crabs usually are abundant and in good shape by opening day.



Virginia

MENHADEN LANDINGS
NOT EXPECTED TO IMPROVE

The outlook for an improved catch of menhaden in the 1967 season is not good, reported Dr. Edwin B. Joseph, head of the Department of Ichthyology, Virginia Institute of Marine Science (VIMS), Gloucester Point, Va. "Although there has been some increase in our samples of young menhaden hatched out in 1965/66 winter season," he noted, "it has not been large, and reports coming to us from other investigations along the coast indicate that the 1966 production of young has been poor."

The Institute has been working to improve methods for predicting the abundance of menhaden a year or more in advance. Sampling the rivers and bay with a fine mesh net provides a measure of the relative abundance of young menhaden from year to year. It also supplies information about the probable fish population that will be available to purse seiners a year or more later.

Testing A Theory

VIMS's Department of Data Processing has intensively studied near-shore currents along the coast. A theory now being tested is that when a predominance of on-shore currents occurs during the breeding and larval season for menhaden, the largest numbers of young fish will appear in Chesapeake Bay--and the fishery will thrive a year later.

The "year classes" (young produced each year) have been weak for the past 4 years. The Chesapeake Bay fishery, which depends primarily on one-and two-year-old fish, now is operating on a short supply not likely to improve this year.

Institute scientists have been interested in locating other sources of fish which might be utilized for meal and oil when menhaden stocks are low. Under a BCF contract, a methodical study is being made of the variety and quantity of fish available in the Virginian Sea over the Continental Shelf at all seasons. It is possible that some species neglected by fishermen may be utilized by fish reduction plants when menhaden are inadequate.



Carp, a product of Europe, crowds native fish population.

BUREAU OF COMMERCIAL FISHERIES PROGRAMS

North Pacific Fisheries Explorations and Gear Development

"COBB" FINDS NO LARGE HAKE SCHOOLS

The "John N. Cobb" returned to Seattle October 14, 1966, after a 4-week exploratory hake fishing survey off the Washington coast-line (Cruise 81). The primary purpose was to determine the distribution of schools of Pacific hake (*Merluccius productus*) while the Cobb worked along with the commercial hake vessels. Other objectives were to obtain biological data and more data on the hake's availability to the Cobb pelagic trawl.

Echo sounding transects were made throughout the area surveyed. When suitable tracings appeared on the echogram, they were fished with the Cobb pelagic trawl to determine species composition and abundance. The concentrations then were sounded out to determine their dimensions. This information was relayed to the commercial boats.

No large schools of hake were found. The five tracings observed on the sounder differed from those of previous cruises. They were not as compact nor as concentrated at any one depth. The first was located 18 miles west of Cape Beal, Vancouver Island; the second 25 miles west northwest of Cape Flattery; the third 15 miles west of La Push; the fourth 14 miles west southwest of Destruction Island, and the fifth $12\frac{1}{2}$ miles west of Cape Disappointment. The catches ranged from 2,000 to 15,800 pounds of hake per one-half hour haul; the total length of the hake ranged from 44 to 64 centimeters. Hake signs in the past were quite distinct and recognizable as hake, but during this cruise echograms believed to be hake turned out to be only large red jellyfish of the genus *Cyanea*. This animal usually causes a problem in the otter trawl and salmon trolling fisheries off the Washington coast. The species seemed quite abundant in summer 1966.

Note: For more information contact Base Director, BCF Exploratory Fishing and Gear Research Base, 2725 Montlake Blvd. E., Seattle, Wash. 98102.

* * *

"COBB" EXPLORES FOR ANCHOVY

The Cobb returned to Seattle November 18, 1966, after a 10-day exploratory anchovy



Area of exploratory anchovy survey of M/V John N. Cobb Cruise 82.

(*Engraulis mordax*) survey in coastal waters off Washington (Cruise 82). A major objective was to determine the catching efficiency of a modified Cobb pelagic trawl. A $\frac{2}{3}$ -scale model of the standard Cobb pelagic trawl with a mesh size of 2 inches and a full $\frac{1}{2}$ -inch mesh line in the codend was used. Sounding transects were made in 10-50 fathoms between the mouth of the Columbia River and Grays Harbor, and in 20-100 fathoms between Destruction Island and Cape Flattery. Signs of fish schools were very scarce. Some indications of fish concentrations occurred in the offing of Grays Harbor. Two sets made there yielded between 30-50 pounds of fish, of which only 8 pounds were small anchovies. Additional cruises will be made to determine whether or not commercial quantities of anchovy are available during the winter months.

Note: For more information contact Base Director, BCF Exploratory Fishing and Gear Research Base, 2725 Montlake Blvd. E., Seattle, Wash. 98102.



Gulf Fisheries Explorations and Gear Development

"BOWERS" TESTS ELECTRO-SHRIMP TRAWL SYSTEM

The M/V George M. Bowers tested the electro-shrimp trawl in the Tortugas shrimp grounds off southwest Florida October 20-November 12, 1966 (Cruise 69). The vessel was again rigged with two 40-foot Gulf of Mexico flat trawls. Again, the starboard trawl contained the electrical system and the port trawl contained a single tickler chain. The heads-on shrimp count was 41 and above, considerably smaller than the 35 and larger taken off the Texas and Mississippi coasts.

The tests resulted in some of the largest catches-per-drag yet accomplished with the electrical trawl. However, for the entire cruise, the electrical trawl averaged 50.1% of the night nonelectric trawl with weight averages of 18.9 lbs./hr., and 37.7 lbs./hr., respectively.

Catch results are arranged in three periods: Period I covers drags completed during good weather. Period II covers the results of drags during and immediately after a protracted stretch of bad weather. Period III results were obtained after the weather improved. During Period II, the catch average was 31%--compared to 51.7% for Period I and 58.9% for Period III--of the night conventional trawl catches.

Although the catch ratio was less than achieved off the Mississippi and Texas coasts, the shrimp catch in pounds during Periods I and III could be commercially acceptable. Expanded to two 40-foot trawls and 10 hours of fishing per day, the 19.5 lbs./hr. and 22.2 lbs./hr. would have produced better than 400 pounds of shrimp each day.

Note: For more information contact Base Director, BCF Exploratory Fishing and Gear Research Base, P.O. Drawer 1207, Pascagoula, Miss. 39567.



North Atlantic Fisheries Explorations and Gear Development

"DELAWARE" STUDIES DUTCH HERRING TRAWL

The M/V Delaware completed the third in a series of industrial fish exploratory cruises

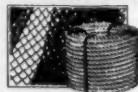
on November 18, 1966 (Cruise 66-10). Its primary objectives were to perform gear trials with the Dutch Herring Trawl using headrope and wing transducers, and a strain gauge on a towing warp, while having the net rigged in a variety of ways; also, to determine relative abundance of industrial fish on the southeast part of Georges Bank, at depths over 100 fathoms in the channel between Georges and Browns Banks, and in deeper areas north of this channel. The vessel made 14 tows: the first 4 primarily gear trials, the remainder survey tows.

The net used for the gear trial and industrial fish survey phases was a Dutch Herring Trawl, which has a 63-foot headrope and 128-foot footrope. After the cruise, the staff of the Gloucester Base concluded that this trawl was not an effective net for bottom survey work due to its overall size, mesh size, and twine size--and that it should be limited to smooth bottom. Also, the net as rigged requires modifications--and that it may be more feasible for the staff to design a trawl more suitable for industrial fish surveys.

Some Results of Industrial Fish Survey

No commercial quantities of herring were found. In the greater fishing depths of the channel between Browns and Georges Banks, argentines (*Argentina silus*) were the predominant species caught. One tow gathered 4,000 pounds and other tows in this general area also produced proportionately high yields. "Taste tests" aboard vessel--and at the Technological Laboratory after cruise--show argentines are an unutilized food fish resource. As survey moved northward to areas west of German Bank and southeast of Mt. Desert Rock, tow results did not show industrial fish species.

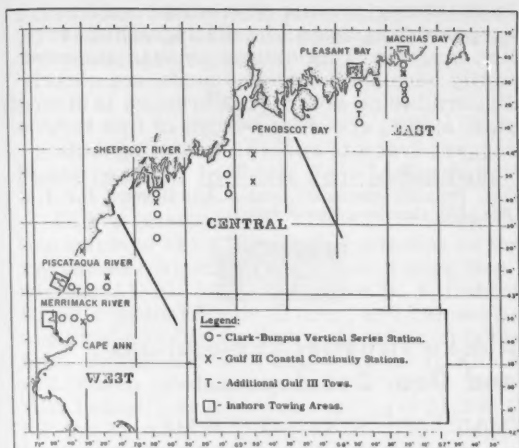
Note: For more information, contact Dr. John R. Thompson, Acting Base Director, EF&GR Base, State Fish Pier, Gloucester, Mass. 01930. Tel: 617-283-6554.



North Atlantic Fisheries Investigations

"RORQUAL" STUDIES ZOOPLANKTON DISTRIBUTION

The R/V Rorqual investigated the inshore-offshore and vertical distribution of zooplankton, with regard to hydrographic conditions, from Cape Ann to Machias Bay, October 9-17, 1966 (Cruise 7-66).



Area of investigations of R/V Rorqual Cruise 7-66.

The following are some preliminary findings: The average concentration of zooplankton along the coast, 1.4cc/100m³, was lower than in the preceding four autumn seasons. Average volumes decreased from west (3.0cc/100m³) to east (0.14cc/100m³). Copepods and cladocerans were the dominant zooplankters (89% of total). Of 14 copepod species in the samples, 4 dominated the catches -- *Centropages typicus* (74% of the total), *Oithona similis* (9%), *Calanus finmarchicus* (6%), and *Temora longicornis* (3%). Dense patches of phytoplankton were encountered all along coast. Two dinoflagellate species, *Ceratium longipes* and *C. fusus*, occurred most frequently in samples and apparently were phytoplankters producing the autumn bloom encountered.

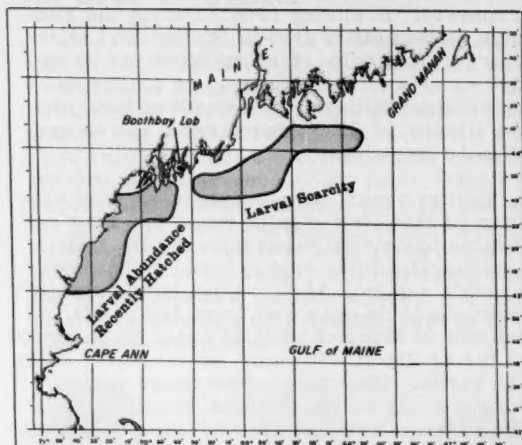
The samples had 1,442 larval fishes, 1,393 of them herring--ranging from 6.3 mm to 20.5 mm; average length was 9.0 mm.

Surface temperatures were seasonally normal, ranging from 8.7°C to 13.9°C. As in previous autumns, vertical mixing of water column increased from west to east.

"RORQUAL" ESTIMATES ABUNDANCE OF LARVAL HERRING

The purpose of the Rorqual cruise of October 17-27, 1966 (Cruise 8-66) was to estimate the abundance and vertical distribution of larval herring and their association with water types. The area of operation was

Cape Ann to Grand Manan Channel, from the headlands to the 50-fathom isobath (see chart).



Approximate location of recently hatched larval herring (R/V Rorqual Cruise 8-66).

Two tows each were made at 46 stations with a Gulf III sampler. One tow was made at a station in Grand Manan Channel. The distribution of herring larvae above and below 20 meters was sampled at three stations. Surface temperatures and water samples for salinity determination were collected at each station. A hydrographic cast was made in Grand Manan Channel.

The chart shows the approximate location of a large group of recently hatched larval herring. Also notable was an area of larval scarcity. No large concentrations of fish were detected on the echo sounder.

Note: For more information, contact BCF Biological Laboratory, W. Boothbay Harbor, Maine 04575.



Central Pacific Fisheries Investigations

SONAR STUDIES OF PELAGIC FISH

Skipjack tuna are one of the large under-harvested resources in the Pacific Ocean. They spend most of their lives in the central Pacific--away from the Americas and Asia. To harvest them in their vast ocean domain, it is necessary to know how they are distributed in the sea.

To help answer this and other questions about increasing the harvest of skipjack and

other high-sea fishes, a continuous-transmission, frequency-modulated sonar was installed on the research vessel "Townsend Cromwell" in spring 1966. During the summer, scientists of BCF's Biological Laboratory in Honolulu obtained information on the sonar's effective range, its ability to determine depth and movement of fish, and the likelihood that sonar targets can be specifically identified.

Before sonar, direct observations of tuna from underwater viewing ports had been limited to only 20 yards because the fish blended with their background. With sonar, a single skipjack $1\frac{1}{2}$ feet long, hung beneath a buoy, could be observed from 258 yards; schools of skipjack usually could be observed as far as 220 to 440--and, on occasion, from 715 yards. Maximum sonar range varied considerably among schools because of different fish sizes and wave heights. The maximum sonar range achieved was 880 yards on a group of porpoise.

Sonar Searches Rapidly

The sonar has high resolution and a high information rate. It can rapidly search a complete underwater hemisphere. The high resolution makes it possible to determine accurately the relation of fish to ship. The high information rate makes it possible to update the fish's position as often as every 30 seconds. So, along with depth information, the biologists also obtained data on the fish's swimming speed and course over short periods. For example, an unidentified subsurface target was found swimming at 2 knots at 27 fathoms. It was tracked as it surfaced, turned, and swam to the ship, where it was identified--a 5-foot whitetip shark.

Some of the most interesting information from these first cruises dealt with depth distribution of subsurface targets in the upper 220 fathoms. One day, most targets were in the upper 6 fathoms, but a second concentration was at 30 fathoms, and a third at 74. The 6-fathom and 30-fathom targets were in the mixed layer (80° F.); the deepest targets in the thermocline were at 69° F. On another day, a mixed group of skipjack and yellowfin tunas was identified at the surface and tracked to 77 fathoms.

If biological targets could be identified to species from sonar data alone, sonar would be an even more powerful tool--especially

in assessing oceanic populations. Already, porpoise targets can be distinguished from fish targets. This distinction was achieved easily because porpoise sounds are clearly discernible on sonar. Differences in strength, size, shape, speed, and depth of fish targets suggest eventual success in distinguishing fish species.

Note: For more information, contact Area Director, BCF, P.O. Box 3830, Honolulu, Hawaii 96812.



Alaska Fisheries Explorations and Gear Development

"MANNING" SURVEYS SHRIMP

The John R. Manning returned to Juneau, Alaska, on November 22, 1966, after completing the first leg of the fall 1966 shrimp survey off Southeastern Alaska. Best catches (240 pounds) of coonstripe shrimp occurred in Charpentier Inlet, inside Glacier Bay. Best catches of spot shrimp (63 pounds) were made in Port Frederick; largest shrimp collected were 11-count spots. The relative fishing efficiency of both the 2- and 3-inch conical tunnel shrimp pots was significantly higher than igloo and ramp-style shrimp pots. Repeated tows with a roller-rigged shrimp trawl showed a significant reduction of debris, rocks, crabs, etc. in the trawl's cod-end.

The Manning departed Juneau on November 27, 1966, to begin the second leg of the survey.



Aerial Photos Reveal Surface Schools in Gulf of Mexico

In early December 1966, the first in a series of aerial surveys of surface-school fishes in the Gulf of Mexico was carried out from BCF's Pascagoula Exploratory Fishing Base. Color and infrared photos were taken of schools between Mobile Bay and Panama City, Florida. About 150 fish schools were sighted along the 40-mile stretch from Mobile Bay to Pensacola and 200 more schools between the latter and Panama City. Most schools were believed to be menhaden. Experimental fishing operations will coincide with future flights to substantiate aerial ob-

servations. They will also obtain preliminary information on possible methods for taking these offshore stocks.



Participation in Paris Fair is Success

BCF's International Trade Promotion Office carried out a successful mission to the Paris International Trade Fair during November 11-21, 1966. Thirteen U. S. fishery firms supplied fresh, frozen, and canned fishery products for the Salon de l'Alimentation fair. Actual sales of king crab meat, shrimp, and frozen lobsters totaled \$120,000. The U. S. industry sees potential sales of \$1,200,000 for the 12 months following the fair. Inquiries were made by importers from Spain, Italy, Belgium, Luxembourg, Germany, Martinique, Algeria, etc.

Maine lobsters, frozen by a liquid nitrogen process, were displayed for the first time and won orders. Several importers would like to negotiate an exclusive agreement with the Maine processor.



Ketchikan Lab Holds Workshop for Fishermen

More than 70 fishermen, processors, and interested citizens recently came to the Fishery Technological Laboratory in Ketchikan to talk about fishing for Alaska prawns. The BCF Exploratory Fishing and Gear Research Unit displayed various types of shrimp pots and methods of rigging them. The Alaska Region's gear experts discussed gear problems, the results of exploratory fishing and plans for future work. Technologists talked about methods of optimum handling and processing aboard vessels.

The workshop began with brief talks. Later, the group moved to the Bureau's warehouse to examine trap types, their construction, rigging, and fishing methods. Fishermen had been invited to bring their favorite traps for comparison.



Dr. Galtsoff Receives Award for Book on Oysters

Dr. Paul S. Galtsoff, a Government scientist who dedicated 40 years to shellfish research, was awarded \$2,500 by BCF on December 9, 1966, for writing "The American Oyster" in 1964. Dr. Galtsoff wrote the 480-page reference for biologists, State administrators of oyster resources, public health officers, students of marine biology, and oyster growers. BCF Acting Director Harold E. Crowther said the book "will stand for a long time as one of the most comprehensive studies ever made of a marine animal. It climaxed an outstanding scientific career in the Federal Government."



Dr. Galtsoff receiving award. From left to right: Dr. Herbert W. Graham, Dr. Paul S. Galtsoff, and John T. Charrett. (Photo: Robert K. Brigham)

"The American Oyster" costs \$2.75 and is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.



BLUEFIN TUNA TAGGED IN JAPAN CAUGHT OFF BAJA CALIFORNIA

A bluefin tuna tagged and released by Japan August 27, 1965, was captured off Baja California July 15, 1966, by the United States purse seiner Jo Linda. It is the first Japanese-tagged bluefin recovered in that area, according to California's Department of Fish and Game. The fish, 36 centimeters (14 inches) when released had grown to 68 centimeters (27 inches) during 323 days of liberty. It was estimated that the bluefin traveled at least 5,000 miles.

Note: See Commercial Fisheries Review, Dec. 1964 p. 62.

FEDERAL ACTIONS

Department of Commerce

EDA APPROVES GLOUCESTER FISHING INDUSTRY STUDY

The Economic Development Administration will finance a study that may open more jobs in the fishing industry of the Gloucester, Massachusetts, area. The study will determine whether a program similar to the agricultural extension service will benefit fishermen, fish processors, and allied trades in the Gloucester-Rockport-Essex area.

The 2-year project will cost \$47,539. EDA has approved \$43,543 for the technical assistance project and the Gloucester Fisheries Commission will contribute services worth nearly \$4 thousand.

The demonstration project will try to strengthen the industry by distributing information to vessel operators and processors on the latest developments in fishing and processing methods; explaining government assistance programs and advising government agencies on industry problems; improving the industry's competitive position with other industries; conducting on-the-job training programs to supply trained fishermen to the area's fishing fleet.

BCF reviewed and recommended approval of the project. It will monitor the study and make periodic reports to EDA.

PLAN CENSUS OF FISHING VESSELS

The Bureau of the Census and BCF are co-operating in preparing a census of commercial fishing vessels for 1967. Information on quantity and value of landings by species and area will be obtained for all U. S. vessels. These data will complement and serve as benchmarks for the annual data collected by BCF's Branch of Fishery Statistics. The census takers will also seek such information as landings in foreign countries.



Department of the Interior

ADVISES ON MILITARY'S FISH PURCHASES

At the suggestion of the President's Council of Economic Advisors, the Departments of Defense (DOD), Agriculture, and Interior are cooperating in the military procurement of food. Large military food purchases have produced much pressure in some markets. To minimize this, DOD will use the current economic analysis of fishery and agricultural products by Interior and Agriculture to prepare annual food plans and menus, and in the food procurement program. This approach will help move abundant commodities and may prevent large price rises in scarce commodities.

FINANCIAL ASSISTANCE PROGRAMS MARK TIME UNTIL NEW FUNDS GRANTED

Fishing Vessel Construction Differential Subsidy Program: Under this BCF-administered program, more subsidy applications were received and approved in 1966 than in any year since the program began in 1960. As a result, the Bureau does not have sufficient funds available to complete the processing of all applications now ready for final action leading to vessel construction. Processing of additional applications necessarily will be delayed until additional funds become available.

Fishing Vessel Mortgage Insurance Program: More and larger applications also have been received by the Bureau for mortgage insurance. Currently, the amount of active applications on hand exceeds the amount BCF is authorized to insure. No further applications for mortgage insurance will be accepted because a nonreturnable filing fee is required with each application. Appropriate notice will be given when BCF again is in a position to accept applications.



Treasury Department

COAST GUARD SAILS FROM TREASURY TO NEW TRANSPORTATION DEPARTMENT

The Coast Guard will be transferred in the next few months from the Treasury Department to the new Department of Transportation, opening a new era for the 176-year-old agency.

The Coast Guard (CG) is an Armed Force, but its primary peacetime mission is to protect life and property at sea. It took on this role in the early 1830s when revenue cutters were directed to conduct winter cruises to aid distressed vessels. In 1966, the CG answered 43,466 calls for help and saved more than 3,400 lives. Of equal importance with search and rescue is its accident prevention function designed to prevent disasters at sea. In 1966, the CG inspected 4,743 U. S. vessels of 11,599,942 tons, and 1,544 foreign vessels of 14,887,164 tons.



COAST GUARD AT WORK: In September 1966, the Coast Guard answered a call for help from the burning fishing trawler "Cara Cara" off the Massachusetts coast. Four of the USCG boats are shown clustered around the trawler. An HH-52A amphibious helicopter lowers a basket with additional fire-fighting equipment. All 7 crewmen were safely removed to one boat. After the flames were put out, a second USCG craft towed the Cara Cara to Scituate, Mass. (Photo: U. S. Coast Guard)

A Century of Oceanography

The Coast Guard carried out its first oceanographic mission in 1867 when the revenue cutter "Lincoln" explored the waters of the Alaskan Territory shortly after its purchase from Russia. Since then, the CG's Alaskan Patrol, ocean station vessels in the Atlantic and Pacific, and the International Ice Patrol have helped expand understanding of the sea. In 1961, legislation gave the CG official oceanographic status. The cutter "Northwind" has carried out investigations of the Kara and Barents Seas north of the USSR. Larger vessels are being equipped with the latest instruments to permit more effective work. The new 378-foot cutter "Hamilton," scheduled to be commissioned early this year, will have fully equipped wet and dry oceanographic laboratories and a computer. The CG makes available information it obtains to oceanographic centers around the world. In 1966, a Marine Sciences Division was set up at CG headquarters with full jurisdiction over the agency's efforts.

On December 15, 1966, the CG acquired the last of the U. S. Navy's deep-draft ice-breaking fleet, the "Burton Island," and became the chief U. S. icebreaking agency. The icebreakers will support the Navy's polar operations.

The Coast Guard has constructed a chain of Loran-C stations off Thailand and South Viet Nam to provide southeast Asia with a system of electronic navigational aids. Loran (Long Range Aid to Navigation) was developed by the Coast Guard early in World War II. The Loran network now circles the world.

The Coast Guard also is replacing the picturesque old lightships with modern offshore structures. In 1966, it commissioned the building of one at Diamond Shoals, about 12 miles southeast of Cape Hatteras, North Carolina. And, in the entrance to New York Harbor, an offshore structure at Ambrose Station will replace the lightship.



INTERNATIONAL

Food and Agriculture Organization

COUNCIL HOLDS 47th SESSION

The 47th Session of the Food and Agriculture Organization (FAO) Council was held in Rome in October 1966. FAO is the specialized agency of the United Nations concerned with raising world nutritional levels and securing efficiency of food production and distribution. The FAO Council is an executive organ composed of 30 member nations, including the United States.

The Council was generally satisfied with the program of FAO's Department of Fisheries and its growth, provided for by the 13th Session of the FAO conference. Several developing countries appealed for more technical assistance in the field and for more FAO subregional offices. Delegates also suggested the need for more work on fisheries training, resource assessment, more and better statistics, marketing surveys, preinvestment studies, and improved liaison with international organizations.

At a ceremony in the FAO Director-General's office, the Japanese Ambassador to Italy signed the International Convention for the Conservation of Atlantic Tuna. At the Council Meeting, 9 nations indicated support of the Convention and said they intended to ratify it (seven ratifications are needed to place the Convention into force).

The next FAO Council Session will be held in Rome, June 12-23, 1967.

INDO-PACIFIC COUNCIL SEEKS TO IMPROVE MARINE FOOD RESOURCES

The Indo-Pacific Fisheries Council of the UN's FAO met in Honolulu, October 3-17, 1966, and worked on a program to improve marine food resources for Southeast Asia. President Johnson has called better use of the sea's resources "one of the most consequential items on the agenda of mankind."

A 2-day symposium on fisheries education and training was devoted in part to papers describing training programs throughout the world. One result was the recommendation

that one or more educational centers be established in the Indo-Pacific region to train extension officers, who could then train fishermen directly. These officers would also provide member nations with training information and advice.

The Council appointed a committee, scheduled to meet in Rome in October, to discuss the programming and coordination of investigations of the Indian Ocean's fishery resources. The Council also considered Hawaii's needs for new fish species to enrich its fauna and suggested several kinds that might be introduced there. And, it decided to promote the preparation of a multilingual manual to identify commercially important species of the Indo-Pacific region. The manual will consist of cards--carrying pictures and local names of fishes--which can be used by fishery officers and fish dealers. The use of cards will enable collection of more reliable statistics.

The Council has 18 member nations. U. S. delegate was John C. Marr, Area Director, BCF, Hawaii. His alternate was John A. Dassow, BCF, Seattle.



ICES Holds 54th Annual Meeting

The International Council for the Exploration of the Sea (ICES) held its 54th Annual Meeting in Copenhagen, Sept. 30-Oct. 12, 1966. ICES acts as scientific advisor to the North-East Atlantic Fisheries Commission.

The Comparative Fishing Committee discussed topside chafing gear, in double-mesh size, it was found to affect selectivity only slightly--a finding shared by the ICNAF Subcommittee on Gear and Selectivity. Several speakers indicated that fishing captains in some countries were reluctant to use this type of chafing gear because it does not prevent large catches from bursting the cod end. The Committee recommended additional research on the problem.

The Herring Committee reviewed the great increase in exploitation of northern North Sea herring stocks. It agreed that a 5- to 30-percent reduction from the 1965 catch

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(more than 900,000 metric tons) was desirable. Ad hoc groups were formed to plan further resource studies using acoustic methods, tagging, and more extensive larval surveys.

The next annual meeting will be held in Hamburg, Germany, during early October 1967. (U. S. Embassy, Copenhagen, October 23, 1966.)



United Nations Approves Marine Resources Resolution

A resolution on the sea's resources, approved by a committee of the United Nations General Assembly, November 9, 1966, calls on the Secretary-General to initiate a comprehensive survey of activities in marine science and technology undertaken by members of UN organizations, member states, and intergovernmental groups.

The Secretary-General also is invited to formulate proposals to expand cooperation in learning more about the marine environment through science and the exploitation and development of marine resources. The resolution recommends that due regard be given the preservation of fish stocks and that marine education and training programs be strengthened.

The Secretary-General is asked to submit his proposals to the General Assembly at its 23rd session in 1968.



International North Pacific Fisheries Commission

HOLDS ANNUAL MEETING
IN VANCOUVER

After reviewing salmon, halibut, king crab, and groundfish resources in the North Pacific, the International North Pacific Fisheries Commission concluded its 13th annual meeting in Vancouver, British Columbia, on November 11, 1966.

The Commission operates under the International Convention for the High Seas Fisheries of the North Pacific Ocean, signed by Canada, Japan, and the United States in 1952. The Convention provides several kinds of action to promote conservation and proper use of the sea's resources. Where resources are exploited by fishermen of 2 or more member countries, the Commission studies the need for conservation measures as indicated by scientific research; if such measures are necessary, it recommends their inclusion in the domestic fishing regulations of each country. Where the Convention characterizes certain resources as being fully exploited and under effective conservation management, it provides that member countries refrain from fishing these resources if they have not previously done so. Under this provision, Canada abstains from exploiting salmon of the Bristol Bay area of Alaska; Japan does not fish for salmon in the eastern North Pacific and Bering Sea, halibut in the northeastern Pacific south of the Aleutian Islands and the Alaska Peninsula, and herring off most parts of the British Columbia coast. The Commission recommended no changes in these provisions.

Recommendations for 1967

One principal task on the agenda was to recommend fishing regulations for the halibut fishery of the eastern Bering Sea in 1967. The Commission has done this since 1963, when line fishing in that area first became open to the 3 countries. For 1967, the Commission agreed to recommend a slight lengthening of the fishing season in the focal part of the fishing ground, referred to as Area A, and intensified conservation measures for areas east and west of it. It will recommend that an extensive area in the southeastern Bering Sea--a nursery ground for young halibut--be closed to fishing completely and, within part of this area, Japan will undertake to prohibit all trawl fishing by its vessels. Canadian and U. S. representatives said their governments intend to require fishermen to release all halibut taken by trawl nets in any part of the Bering Sea. The Japanese delegates said their government intends to apply a minimum size limit of 66 centimeters (26 inches) for halibut to Japanese fishing operations throughout the Bering Sea.

In the Gulf of Alaska, the Commission's studies focused on effects of the expanding

trawl fisheries for various species of bottom-fish and shrimp on the halibut stocks, which are exploited by Canadian and United States set-line fishermen. Groundfish catch statistics were exchanged. Scientists studied reports on numbers of halibut found in bottom-fish trawl catches. The Commission approved recommendations by its Gulf of Alaska Groundfish Committee for further research in this field.

After considering king crab research, the Commission recommended that research on this species in the eastern Bering Sea be continued and strengthened.

The Commission noted reports that South Korea may enter the salmon, and perhaps other, fisheries in the Convention-covered area. It requested the Commission's chairman to call these reports to the attention of member governments, express the Commission's grave concern over the implications of such an action on its conservation program, and to ask the member governments to consider the matter.

The next annual meeting was scheduled for Tokyo, beginning November 6, 1967.



U. S. and Japan Renew King Crab Agreement

On November 18, 1966, the United States and Japanese delegations successfully concluded consultations in Washington on the Japanese king crab fishery in the eastern Bering Sea. The negotiations began November 14. The delegations agreed to recommend to their respective Governments extension for another two years of the agreement of November 1964. There is a single exception: the annual Japanese king crab catch for 1967 and 1968 would be set at the equivalent of 163,000 cases to avoid possible overfishing. The Japanese catch for 1965 and 1966 was the equivalent of 185,000 cases. The delegations also agreed to recommend further intensification of the study and research of the king crab resource in the eastern Bering Sea and presentation of the results to the International Commission under the North Pacific Fishery Convention.

The United States delegation was headed by Ambassador Donald L. McKernan, Special Assistant for Fisheries and Wildlife to the Secretary of State; the Japanese delegation was headed by Minister Ryoze Sunobe of the Embassy of Japan in Washington.



U.S. and USSR Hold Talks in Moscow

United States and Soviet fishery experts completed 10 days of talks on November 25, 1966, in Moscow, preparatory to a later meeting in Washington, D. C. Scientists assessed the condition of certain fish stocks exploited by Soviet and U. S. fishermen in the Pacific Ocean, primarily off the Oregon and Washington coasts, and in the Atlantic Ocean off the mid-Atlantic States. The talks also dealt with navigational and other technical problems caused by the appearance on the fishing grounds of many different-sized vessels using differing fishing tactics. The participants identified several categories of technical and navigational problems and various possible means for dealing with them.

The U. S. group was led by William M. Terry, BCF's Assistant Director for International Affairs. The Soviet group was headed by Peter A. Moiseyev, Deputy Director of the Soviet All-Union Institute of Marine Fisheries and Oceanography.



Fish Meal

WORLD PRODUCTION ROSE 23% IN JANUARY-OCTOBER 1966

The world's production of fish meal in the first 10 months of 1966 increased about 23 percent over the same period of 1965. Output in 1966 was up sharply in Peru, Chile, and Norway. U. S. output was down.

Most of the principal producing countries submit data monthly to the International Association of Fish Meal Manufacturers (IAFMM) (see table).

World

Count

Canada

Denmark

France

Germany

Netherlands

Spain

Sweden

United States

United Kingdom

Angola

Iceland

Norway

Peru

So. Africa

S. West Africa

Belgium

Chile

Morocco

Total

1/Date

2/Date

3/Date

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World Fish Meal Production by Countries, October 1966
with Comparisons

Country	Oct.		Jan.-Oct.	
	1966	1965	1966	1965
..... (Metric Tons).				
Canada	4,056	7,404	74,568	72,203
Denmark	11,564	12,578	94,902	103,683
France	1,100	1,100	11,000	11,000
German Fed. Repub.	6,543	6,190	61,750	57,404
Netherlands	1/	505	2/1,510	4,884
Spain	1/	1/	1/	3/13,247
Sweden	902	688	4,766	6,089
United Kingdom	7,249	6,633	73,559	66,669
United States	9,834	11,175	151,684	199,994
Angola	1/	6,343	4/ 36,211	35,362
Iceland	21,266	14,734	142,755	120,436
Norway	45,386	32,021	401,090	285,680
Peru	175,711	41,463	1,280,822	951,553
So. Afr. (including S.-W. Afr.)	6,690	6,375	251,911	267,824
Belgium	375	375	3,750	3,750
Chile	5,067	885	188,200	52,581
Morocco	1/	3,150	4/ 21,300	16,050
Total	295,743	151,619	2,799,778	2,268,369

1/ Data not available.

2/ Data available only for January-April 1966.

3/ Data available only for January-May 1965.

4/ Data available only for January-September 1966.

Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers.

* * *

FEO PRODUCTION AND EXPORTS,
JANUARY-AUGUST 1966

The member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

FEO Exports of Fish Meal, January-August 1966

Country	August		Jan.-Aug.	
	1966	1965	1966	1965
..... (1,000 Metric Tons).				
Chile	15.9	4.7	132.9	56.0
Angola	1/	2.9	2/27.9	30.1
Iceland	17.4	16.2	98.7	80.5
Norway	26.2	30.3	155.7	147.5
Peru	87.0	46.6	945.3	1,076.1
So. Africa (including S.-W. Africa)	12.6	22.1	102.3	154.8
Total	159.1	122.8	1,462.8	1,545.0

1/ Data not available.

2/ Data available only for January-July 1966.

Atlantic Tuna Convention
Signed by 5 Nations

A convention to conserve the resources of tuna and tunalike fish of the Atlantic Ocean is receiving international recognition. On October 28, 1966, Japan became the fifth country to sign the Convention, following Brazil, Spain, South Korea, and the United States. It will come into force when 7 nations have ratified or otherwise approved it.

The convention was drafted at a 17-nation conference in Brazil, May 1966. It grew out of fears that Atlantic tuna were being overfished and that stocks might be damaged if the present fishing rate was maintained. The convention provides for the creation of an international commission to collect, analyze, and publish statistical information and recommend levels that will permit the maximum sustainable catch. (Food and Agriculture Organization, Rome.)



Studies Antarctica's Palmer Peninsula

A U.S. scientist is accompanying a British expedition supplying bases in the Antarctic during the short summer between December 1966 and March 1967. His assignment is part of an international program of peaceful scientific cooperation between the 12 signatory nations of the 1959 Antarctic Treaty. Each country invites scientific personnel from other nations to accompany such expeditions.

The scientist, Theodore R. Merrell Jr., supervisor of the Alaska Federal research programs on pink and chum salmon, has been with BCF's Auke Bay (Alaska) Laboratory for 10 years. He was chosen by the National Scientific Foundation. Merrell will evaluate the Palmer Peninsula area for fisheries and oceanography research by the U.S.

The Palmer Peninsula

The Palmer Peninsula is a mountainous peninsula several hundred miles long extending toward the tip of South America. It was named for the captain of a U.S. fur sealing ship who discovered the Antarctic Continent in 1820. The peninsula is on the opposite side of the "White Continent" from the major U.S. research bases. It has several United Kingdom, Chilean, and Argentinian year-round bases. Seals, sea birds, and fish are abundant. Whales were also numerous until recent years, but overkilling has nearly exterminated them.

FOREIGN

CANADA

EAST COAST PLANS FISH MEAL DEVELOPMENT

Two 125-foot seining vessels from Norway, scheduled to arrive in November 1966, will train Newfoundland fishermen around Stephenville. A new fish meal plant is to be established there, reportedly with help from two United States firms. According to a Newfoundland engineering firm, the Norwegian seiners "Stella Kristina" and "Stella Maria" will employ 25-man crews. There is cargo space for 350 tons of fish below deck and 50 tons on deck. The vessels will use seine nets measuring 227 fathoms by 92 fathoms for fishing in depths up to 120 fathoms off Newfoundland. (U. S. Consul, St. John's, Oct. 20, 1966.)

The Canadian Government believes the East Coast herring resource can support a much larger fish meal industry. Herring catches up to 150 tons a set were taken in the Gulf of St. Lawrence in summer 1966 by the 80-foot "Western Ranger" (from British Columbia) chartered by the New Brunswick Department of Fisheries.

WILL NOT LIMIT PACIFIC SALMON FISHING LICENSES IN 1967

Licenses to engage in the British Columbia salmon fishery in 1967 will be issued to any Canadian citizens applying before the deadline date of May 31, 1967.

The Canadian Government had proposed earlier that such licenses be issued only for vessels licensed to fish salmon in 1966, or which replaced such vessels. However, unforeseen difficulties require that more detailed discussions than anticipated be held with fishermen and industry in British Columbia. (Canadian Department of Fisheries, Vancouver, Oct. 28, 1966.)

SUBSIDIZES DOGFISH SHARK PROCESSING

To encourage the production and marketing of dogfish shark products, the Canadian

Government announced on October 28, 1966, its readiness to assist by paying fishing companies 11 Canadian cents a pound on the production of up to 225,000 pounds of skinned dogfish flaps. This represents about 1,100 tons of whole dogfish.

The program continues the experimental marketing program started a year ago. At that time, it gave promise of expanding and providing a regular market in Europe for dogfish products. Companies participating in this program must provide the Department of Fisheries with a record of all costs associated with the program and reimburse fishermen at specified minimum costs.

It is recognized that the market for dogfish carcasses is limited. Under the new assistance program, companies can choose between purchasing round, fresh, dogfish direct from fishermen and producing flaps, carcasses, and livers-- or buying unskinned flaps from fishermen and producing only skinned flaps. In the latter, livers from dogfish can be sold through the fishing company or directly by fishermen to domestic buyers.

The Canadian Government wants to help reduce the large dogfish population that has become a problem to commercial and sport fishing on the Pacific Coast. At the same time, the program may encourage new markets. This could possibly develop into an operation that could sustain a dogfish operation without Government assistance. (Canadian Department of Fisheries, Vancouver, October 28, 1966.)

REPORT PROPOSES FRESH-WATER FISH EXPORTS BE CONTROLLED

A report by a Commission of Inquiry recommends that a freshwater fish marketing board be set up to handle all export and inter-provincial sales of freshwater fish in North-western Ontario, Manitoba, Saskatchewan, Alberta, and the Northwest Territories.

The report proposes that the board be the sole buyer of freshwater fish from Canadian fishermen, but that services of present exporters, packers, and processors be utilized under contract with the board.

Canada (Contd.):

The report is being studied by the Federal Government, which will consult Provincial Governments and trade representatives before it decides on the report's recommendations.

The Commission was set up in 1965 following recommendations of a Federal-Provincial Prairie Fisheries Committee that studied instability of prices and demand in freshwater fisheries products and more efficient marketing means to improve returns to primary producers. (Canadian Department of Trade and Commerce, Ottawa, Oct. 17, 1966.)

* * *

TESTS SCOTTISH SEINE VESSEL
IN HERRING FISHERY

The "Guiding Star," a 70-foot wooden vessel powered by a 152-horsepower diesel engine, has crossed the Atlantic from Aberdeen, Scotland, to Newfoundland. She is under a one-year charter to the Industrial Development Service of the Canadian Federal Department of Fisheries to determine whether Scottish seine netting can be adopted profitably by the herring industry. The Guiding Star will engage in full-scale commercial fishing. She also will undertake exploration.

A Scottish crew of seven will operate the vessel from ports in Newfoundland and later move to Nova Scotia, New Brunswick, Prince Edward Island, and Quebec. (Canadian Department of Fisheries, Ottawa, Oct. 6, 1966.)

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TO BUILD MULTIPURPOSE
PATROL-RESEARCH VESSEL FOR PACIFIC

Canada has awarded a contract for the construction of a multipurpose Department of Fisheries patrol vessel. Costing \$2.8 million, it will be delivered in mid-1968.

The 180-foot steel vessel will be the largest and most versatile craft of the Department's protection fleet of 40 vessels on the Pacific coast. Besides regular patrol duties, she will be equipped for experimental fishing, oceanographic and biological research, and search and rescue activities. Her cruising range of several thousand miles will per-

mit patrols to and from the Bering Sea without refueling. (Canadian Department of Fisheries, Ottawa, Nov. 23, 1966.)

* * *

CONDUCTS EXPLORATORY SHRIMP
TRAWLING OFF BRITISH COLUMBIA

A 70-day shrimp trawling survey in Hecate Strait and Queen Charlotte Sound with the "Belina" was carried out by the Nanaimo Biological Station of the Canadian Fisheries Research Board.

Even before final assessment of the results were made, the scientists agreed that only one or two spots have commercial possibilities. In scores of net tows, the best showing of shrimp was found off Milbanke Sound, near the northeast corner of Goose Island fishing grounds. That is in the general area from Cape Mark to Currie Island. Of the 22 tows made there, to depths down to 700 feet, the best yielded more than 550 pounds. The average catch of all tows in that area was about 135 pounds.

Interesting prospects were found in Laredo Sound. Nine tows were completed from Kitasu Bay to Moody Banks. In one tow off Lombard Point, 182 pounds of shrimp were landed. The average tow yielded 89 pounds. (Canadian Department of Fisheries, Vancouver, Nov. 23, 1966.)

* * *

STUDIES FISHERIES TRAINING
IN USSR, NORWAY, AND BRITAIN

A group of Federal and Provincial officials engaged in fisheries vocational training was scheduled to arrive in Moscow November 23, 1966, to begin a 2-week study of Soviet fisheries training methods. The Canadian group will then visit Norway and Britain. The tour resulted from a proposal made by the Canadian Federal-Provincial Atlantic Fisheries Committee.

Under a reciprocal arrangement, a group of Soviet fisheries officials will visit Canada early this year to study Canadian training methods. (Canadian Department of Fisheries, Ottawa, Nov. 18, 1966.)

* * *

Canada (Contd.):

SECOND JOINT JAPANESE-CANADIAN
WHALING COMPANY FORMED

Taiyo Fishing Company of Japan and the Canadian Fishery Products Company were scheduled to establish in mid-December 1966 a joint whaling venture in Newfoundland with a capital investment of \$100,000. To be named "Atlantic Whaling Company," the joint company will conduct whaling operations with Taiyo's catcher vessel "Fumi Maru No. 15" (471 gross tons). Catch target for 1967 whaling season (June-September) was set at 175 blue whales.

Earlier in 1966, a Japanese fishing firm, Kyokuyo Hoge, sent its whaling vessel "Kyo Maru No. 17" (754 gross tons) to Newfoundland on an exploratory trip, with plans to enter into a joint venture with Canadian interests. (Minato Shimbun, November 27, 1966.)

* * * *

EXPANDS EAST COAST
HERRING EXPLORATIONS

The recently built British Columbia herring purse-seine vessel "Western King" arrived at Harbour Breton, Newfoundland, in early December 1966 and began exploratory fishing for herring and capelin. She made the trip via the Panama Canal.

The 90-foot vessel is under charter until summer 1967 to the Industrial Development Service of the Canadian Federal Department of Fisheries. The main purpose is to obtain information on offshore stocks in the rapidly expanding herring fishery of the Northwest Atlantic. Canada previously explored for herring in inshore waters. The vessel also will carry out exploratory fishing for capelin and similar species off Newfoundland and Nova Scotia and in the Gulf of St. Lawrence. Another purpose is to demonstrate modern purse-seining techniques and shipboard fish-handling methods.

The vessel is commanded by an experienced British Columbia skipper who fished successfully earlier this year in the Gulf of St. Lawrence. The crew, which includes Newfoundland fishermen will also try to determine the feasibility of developing a year-round, deep-sea capelin fishery.

At the request of Newfoundland fisheries authorities, the Western King began exploratory fishing operations in Placentia and St. Mary's Bays for the benefit of inshore fishermen.

One shipboard technique to be used is holding herring and capelin in refrigerated sea water, a method developed by Federal fisheries technologists and used to some extent on the Pacific coast. (Canadian Department of Fisheries, Ottawa, Dec. 8, 1966.)



FISHING BY HELICOPTER IN NEW ZEALAND

A helicopter is the latest tool for commercial fishermen in New Zealand. A new company plans to use the helicopter to set as many as 50 miles of fishing line and 50,000 hooks in the water each day. Nets and crayfish pots will also be laid. The haul of fish will be carried in nets slung under the helicopter.

Lines laid close to shore will be pulled in by jeep, while those farther out will be retrieved by a man in a small boat.

To protect their catch, the aircraft will be armed with harpoons to shoot sharks. (Reprinted, with permission from Science News, weekly summary of current science, c 1966 by Science Service, Inc.)

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LATIN AMERICA

Peru

REPORT ON FISH MEAL AND OIL

Peru is the world's leading fishing nation in tonnage landed and its position is owed to the anchovy--the most important commercial fish in Peruvian waters and the principal source of fish meal and fish oil.

The relatively new fish-meal industry rose to great importance only within the past 6 years and now accounts for 25-30 percent of the total value of Peru's exports. Its 149 plants and about 1,800 purse-seiners ("bolicheras") are important employers.

In 1963, Peru produced 1.5 million metric tons of fish meal and sold it for an average of US\$130 a ton f.o.b. Callao. In 1964, production dropped to 1.2 million tons and the average price rose to \$160 a ton. The users found the supply unreliable, the cost exorbitant, and shifted to substitutes. In 1965, production was 1.4 million tons; average price was \$140 a ton. In October 1966, the average price was \$125 a ton. It is estimated that the average price for the present season will be about \$130 a ton.

On September 1, 1966, stocks stood at 243,896 tons. On October 1, the estimated stocks had risen to 296,688 tons; sales were very slow; about 200,000 tons had been sold against future shipments.

September 1966 Production A Record

Production in first-half September 1966 was 61,636 tons; for second half it was estimated at 60,000 tons--a record September and almost double the next best September. An excellent fishing year was forecast. The catch is not expected to be less than 7.5 million tons and may be higher.

There are possibly more than \$45 million in bank loans to the industry. Also, suppliers have extended much credit to their customers, perhaps as high as \$150 million. While it is difficult to assess the value of investments, some place it at \$200 million.

In October 1965, when the fishing season began, the industry faced an uncertain future. There were gloomy forecasts of a drastically reduced catch. However, production reached a record before the latter half of the season.

Initially, the Government limited that season's catch to 7 million metric tons. Later, it extended the season several weeks, permitting the limit to be exceeded. The actual allowable tonnage is determined during the season, based in part on recommendations of the Peruvian Ocean Institute.

The labor force in the plants and fleets must be considered. The last season was extended partly because of pressure from workers facing almost 4 idle months due to the closed season. Strikes have not been unusual. An extended strike in a major fishing area could affect production and world price.

The fishing fleets have expanded rapidly in number and size of vessels. This increase has been disproportionate to the increase in fish meal production. For example, in 1962, 1,070 seiners (with a total hold capacity of 58,713 tons) landed anchovy for a fish meal production of 1,120,796 tons. In 1963, 1,523 seiners, with a combined capacity of 98,460 tons, caught anchovy for a production of 1,159,233 tons of meal.

For the past 4 years, fish meal stocks at the end of August, traditional end of the fishing season, were:

Year	Metric Tons
1966	244,807
1965	46,425
1964	129,356
1963	142,377

The great increase in 1966 stocks is believed to reflect the lower world price, the waiting attitude of producers who thought they may have sold hastily in 1965, and fish meal sold but unshipped on that date.

Fish meal is shipped to many countries. In the first 8 months of 1966, destinations for important shipments--given as percentages of total shipments of 945,335 metric tons--were:

Country	Percentage
West Germany	19.5
United States	19.1
Netherlands	10.7
Spain	7.2
East Germany	6.5
Italy	6.2
Japan	5.9
Yugoslavia	5.1
Mexico	4.2
Poland	3.6
Others	12.0

Peru (Contd.):

Fish Oil Production Less Than Expected

Fish oil is derived from anchovy processing and is exported crude and semirefined. Production in 1965 and 1966 was less than would have been expected from the tonnage of fish landed because the fish were of small size and oil content.

Crude and semirefined oil exports were:

Year	Metric Tons
1966 (1st 8 months)	49,557
1965	111,238
1964	134,023
1963	110,035
1962	150,596
1961	98,088

Crude and semirefined oil was shipped to: Colombia, Denmark, Ecuador, France, Germany, Mexico, Netherlands, and Norway.

In the long run, the fish meal industry needs better plants (not more plants), better and larger fishing vessels (not simply more vessels), improvements of its overextended credit, a stable price for fish meal, increased research, and better trained men at all levels, afloat and ashore. (U. S. Embassy, Lima, Oct. 11, 1966.)



El Salvador

SHRIMP IS NO. 1 COMMERCIAL FISHERY

The only commercial fishery of importance in El Salvador is the shrimp fishery. Almost the entire production is exported to the United States. In recent years, about 5 million pounds, valued at about US\$ million, have been exported annually. An average of about 68 vessels accounts for the catch. (The Government presently restricts the number of shrimp vessels to 73.) The 68 vessels also land, incidental to the shrimp, about 3 million pounds of fish a year. Except for a small quantity exported to Honduras, the fish is sold entirely on the local market. Shrimp are El Salvador's third most valuable export--coffee and cotton are one-two.

The production of shrimp from coastal waters up to about 40 fathoms is believed at its peak, but further resources may exist in deeper waters. Modest increases in production can be expected in bottomfish trawling, pelagic fishing (chiefly anchovy for fish meal), and shellfish (from culture activities).

Marine science activities in El Salvador are restricted to very modest marine biology and resource-evaluation programs in the Government's fisheries administration, in the Ministry of Economy, and in the Biology Department of the University of El Salvador. Both programs are stimulated and supervised by a fishery biologist of the UN's Food and Agriculture Organization (FAO) and an associate expert.

The Government is keenly interested in expanding its fishing industry through internationally coordinated research. It was the original sponsor of a request to the Development Program (formerly Special Fund) of the United Nations for technical assistance on a regional basis (with the 5 Central American countries and Panama). The project was approved and is expected to initiate operations with headquarters in El Salvador. The nation also participated in a request to the UN Development Program for a regional project of coastal hydrography studies to improve navigation facilities and port development. This request presently is being considered. (U. S. Embassy, San Salvador, Nov. 29, 1966.)



Argentina

STERN TRAWLERS
CATCH AND FREEZE OCTOPUS

Two small freezer stern trawlers, "Puerto Madryn" and "Bahia Camarones," were delivered recently from Spain to Argentina. They are designed primarily to catch and freeze octopus (pulpo) on the Mauretanian fishing grounds. The octopus is a very profitable fish for the Argentine market. The vessels also will be used off the Argentine coast for fresh fish and frozen fish as the market demands.

They are equipped for stern trawling using the Unigan system, which is well suited to their size. Preparation tables with washing facilities are fitted behind the winch under the shelter of the superstructure deck. An overhead conveyor, with hooks on it, carries the octopus to be frozen from the preparation tables to the freezer compartment forward of the winch on the port side. The stomachs are removed and drained; there is further drainage on the conveyor.

Argentina (Contd.):

Two, 20-station, vertical plate freezers of the top-unloading type are provided, with a total maximum freezing capacity of nearly 15 tons a day. Each freezer station is fitted with 4 removable dividers so, when freezing octopus, 5 evenly shaped blocks are produced; but one large block may be produced, if desired, for other types of fish. In the extremely small space available, no other type of freezer of equal capacity could have been accommodated satisfactorily.

After freezing, the blocks of octopus are packed in cardboard cartons, 5 blocks per carton. They are passed down through a very small hatch into the forward end of the frozen fish hold, where a temperature of -25°C . (-13°F .) is maintained. To save storage space, the frozen fish hold is cooled by spirally gilled convection cooling grids mounted on deckhead only. Wooden battens are fitted to ship's sides and bulkheads, and gratings on the deck, to allow natural circulation of cold air around the frozen cargo. The storage capacity for cartons of frozen octopus should be about 80-90 tons maximum.

The owners intend to use the vessels for fresh fishing outside the octopus catching season. For this purpose, the deck insulation in the hold has been made watertight, and a slush well is provided for removing melt water. In addition, a small insulated space, aft of the main hold, can be used to provide extra storage capacity. (Coprma-Ranken, S. A., Madrid 10, Spain, Aug. 1966.)



Chile

FISH MEAL FIRMS INTEGRATE

Some fish meal firms have integrated into a single operation to offset the financial difficulty experienced during the relatively poor 1965 season. The Chilean Industrial Development Corporation (CORFO) has set criteria for integration and will financially support certain activities and assist in selling fish meal produced by the integrated plants. Two groups already have been formed and negotiations are taking place for creating others. (Pesca, July 1966.)



Mexico

12-MILE FISHING LIMIT BILL IS SENT TO CONGRESS

On October 20, 1966, President Diaz Ordaz signed and sent to the Congress an amendment to the 1935 law that would extend Mexican fisheries jurisdiction from 9 to 12 miles. The territorial sea of 9 miles would remain in effect with an extension of 3 miles applicable only to fisheries jurisdiction. If enacted, the new law would permit foreign nationals now fishing in the 9- to 12-mile zone to continue in that zone without restriction for 1 year starting January 1, 1967. During that period, Mexico would negotiate with the governments of those nationals the conditions under which they would be permitted to continue fishing in that area for a maximum additional 5-year period--through 1972. Starting in 1973, however, no foreign country would be permitted any fishing rights within the 12-mile limit, and no historic fishing rights of nationals of any country would be recognized. (U. S. Embassy, Mexico, Oct. 21, 1966.)



Brazil

EXTENDS FISHING LIMIT TO 12 MILES

On November 14, 1966, President Castello Branco signed a decree extending Brazil's territorial sea from 3 to 6 miles. The decree also established an additional 6-mile contiguous zone, thereby extending Brazil's fisheries jurisdiction to a total of 12 miles. (U. S. Embassy, Rio de Janeiro, November 17, 1966.)



SPECIAL DIETETIC VALUES



WEST INDIES

Jamaica

PLANS TO EXTEND TERRITORIAL WATERS FROM 3 TO 12 MILES

Acting Prime Minister Donald Sangster, informed Parliament on October 18, 1966, of the government's decision to extend Jamaica's territorial waters from 3 to 12 miles. After parliament's approval of necessary legislation, a declaration will be made to the United Nations about this unilateral decision to expand the breadth of territorial waters around Jamaica, including the Morant and Pedro Cays.

The present 3-mile limit was established while Jamaica was a British colony. The need to protect the fishing industry was given as the primary reason for the extension. However, Sangster also noted that security interests were involved. (U. S. Embassy, Kingston, October 21, 1966.)



ELECTRIC SHARK BARRIER TESTED

An electrical shark repellent system is being tested by scientists from South Africa's National Physical Research Laboratory. It consists of two electrodes anchored to the sea floor and connected to a land-based generator. According to reports, laboratory experiments have shown that sharks in the presence of an electrical field tend to swim toward a positive electrode and away from the negative. The electrodes to be used in this test are so arranged that the positive electrode is farthest out to sea. A shark entering the electrical field will then presumably swim away from the shore. ("Sea Secrets," 1966.)

MID EAST

Israel

RECEIVES STERN TRAWLER-PURSE SEINER FROM DUTCH YARD

Probably the largest stern trawler yet built, which also can operate as a purse seiner without conversion, has been delivered to an Israeli firm by a Dutch shipyard. The 567-gross ton vessel the "Yam-Suf" is designed for tropical operations in the Red Sea and off the east and west coasts of Africa. The vessel can freeze 10 to 12 tons of fish a day. The purse-seine equipment is fitted on the starboard side and includes brailing boom and power block. The normal trawl winch is used to haul the purse-seine. A bow thruster unit is included to aid seine fishing. General specifications: length overall, 161 feet; moulded breadth, 28 feet; and main diesel engine, 1,200 horsepower.



Iran

AWARDS CAVIAR CONTRACT TO NEW YORK FIRM

A New York City firm, whose 3-year contract with the Iranian Fisheries Corporation had just expired, signed a 5-year contract for the sale of about 65 tons of Iranian caviar annually. The firm bid successfully on a tender covering all sales to the U. S. market. The Iranian Fisheries Company is government-controlled. (U. S. Embassy, Tehran, October 17, 1966.)



Kuwait

SHRIMP VESSELS BEING BUILT IN POLAND

The Szczecin Shipyards in Poland are building 20 steel cutters for Kuwait. The vessels are 17.6 meters (57.7 feet) long with a 170-hp. motor and a crew of 5. They will be used in shrimp fishing. (Budownictwo Okretowe, No. 7-8, 1966.)



EUR

USSR

STRENGTHENING FISHING

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EUROPE

USSR

STRESSES NEED TO IMPROVE FISHING INDUSTRY

In the list of 108 slogans approved for last October's 49th anniversary of the Russian Revolution approved by the Central Committee of the USSR Communist Party, slogan 79 was directed at the fishing industry. It stressed 3 aspects: 1) increased catch, 2) better quality of fishery products, and 3) lower costs for primary production. Of 28 industries or services, the fishing industry was one of only 4 where the necessity of lowering costs was specifically mentioned. The other 3 were transportation, coal mining, and hydroelectric power construction.

The slogan confirms the impression of some readers of Soviet publications that production costs are going to plague the fishing industry in the years ahead. New economic directives recently promulgated by the Soviet Government--"profit" not production is paramount--will begin to be introduced into the fishing industry early this year.

GOOD HERRING SEASONS IN NORWEGIAN SEA EXPECTED

The Norwegian Sea herring fishery was expected to be the largest operation conducted from the northwestern USSR during the 1966 fall fishing season. The Polar Scientific Research Institute for Fisheries and Oceanography (PINRO) forecast a good herring season because of the extremely large 1959, 1960, and 1961 year-classes--largest in recent years. Soviet scientists predict good herring fishing there at least until 1968.

The Fishery Administrations for Western and Northern European Soviet Union (headquartered at Riga and Murmansk) hoped that by increasing productivity of fishermen, improving gear, and increasing number of larger vessels, the 1966 average catch would be better than in 1965--despite forecasts by scientists of lower average catch per gill net. The 2 administrations are working on plans for the 1967 herring fishery.

Also, the Murmansk Fisheries Administration engaged in these fisheries during October 1966: 1) cod fishing off Western Greenland (1966 forecasts indicated better catches than 1965); 2) halibut fishing in the northern Atlantic (although catch expected to be lower than 1965, the forecast was for about 10 tons a day per vessel; in 1964, the total Atlantic Soviet halibut catch was 27,000 metric tons).

In the Barents Sea fishery, where catches have declined for years (probably because of overfishing) a dozen exploratory vessels were added to the fleet to find new stocks of the species formerly fished.

INCREASES HAIR SEAL HERDS IN CASPIAN SEA

By restricting the catch of adult, male, Caspian Sea hair seals, the Soviets have increased the herds to about 1 million animals. The Soviets plan to exploit hair seals at an increasing rate and, by 1980, hope to harvest 130,000 skins yearly. The processed skins are sold abroad and used for sport coat trimmings, ski skins, etc. Auctions take place in Copenhagen. Most of the world supply comes from Greenland.

UNDERWATER CRAFT TO STUDY CONTINENTAL SHELF RESOURCES

Leningrad designers have finished the blueprint for the construction of an underwater laboratory craft to study the fishery resources of the Continental Shelf. The laboratory, to be known as Benthos-300, will have a movie camera with telephoto lenses installed in the observation room. The facilities will be unusually spacious: 10 scientists at a time will be able to spend up to 2 weeks underwater in air-conditioned cabins with showers. There will be a dining room and kitchen for the crew. A rescue tower will connect the laboratory with the surface; equipped with a lock chamber, it will permit the crew to escape.

The Soviets are not neglecting the exploration of deeper ocean waters and the development of deep-water trawling, but they are quite aware that the bulk of the world's fishery catch (excluding seals and whales) is

USSR (Contd.):

presently landed from the Continental Shelf. The Benthos-300 is yet another indication that in the immediate future a great part of the Soviet fishing effort will continue to be on the Continental Shelf, where Soviet research has paid off in recent years by greatly increased landings.

The Institute involved in these plans is the Leningrad Branch of the Design Institute of the Fishing Fleet.

COLOR OF TRAWL NET AFFECTS CATCH

A Soviet gear specialist was recently placed aboard the medium side trawler "Navarin" fishing in the Gulf of Alaska to determine how the color of trawl nets affects catches. He found that a red-colored trawl caught more fish than a white trawl.

STUDY SEAWEEDS AS FOOD FOR COSMONAUTS

Scientists are studying the use of micro-algae as food for space travelers on lengthy flights. Certain algae contain all the elements needed to feed man; also, they produce oxygen and absorb carbon dioxide. (Tass, October 12, 1966.)

The Soviet research may be done at least in part at Moscow's VNIRO Laboratory for the Study of the Technology of Marine Invertebrates and Seaweeds.

TEAM VISITS BRITISH LABORATORIES

A 3-man team of Soviet fisheries scientists visited Great Britain's biological laboratories at Lowestoft, Torry, and Aberdeen, the fishing ports of Hull and Grimsby, and other fishery installations. (Fishing News, October 28, 1966.)

The team found the Hull Fish Meal and Oil Works very interesting. The Soviet Union is greatly concerned about raising her fish meal production efficiently. Team members were second-level Soviet senior fishery sci-

tists: Poliakov, Director of the Baltic Fisheries Research Institute, the leader; Ponomarenko, head of a laboratory at the Murmansk Fisheries Research Institute; and an engineer.



Scandinavia

SEEKS GREATER CONSUMPTION OF HERRING FOOD PRODUCTS

Iceland has proposed, and other Nordic countries are considering, the possibilities for upgrading the use of valuable herring stocks in the North Atlantic, according to a leading Danish trade periodical. When big catches are landed, as in 1966, the major part goes to the oil and meal factories. The Scandinavians say it is unfortunate that herring is not used as human food to a greater extent.

In the last five years, Iceland has tried to improve the marketing of herring products, but the results have not been sufficient to accommodate the present large catches. A leading Icelandic industry member has proposed that a Nordic committee be formed to expand the use of herring products for human consumption by applying modern food preservation techniques. He suggested that working capital might be supplied by a tax on all herring exported from participating countries. If people throughout the world merely had the opportunity to buy herring, he said, they would enjoy it just as the Northern Europeans have for so many years. (U. S. Embassy, Copenhagen, Nov. 2, 1966.)



Iceland

GROUND FISH CATCH DROPS, HERRING FISHERY EXPANDS

The main trends in Iceland's fisheries are a declining groundfish catch, a rapidly expanding herring fishery, and rising production costs. So declining world prices for fish meal and oil may cause difficulties. (These trends interest the United States and other countries. Iceland is second only to Canada as a supplier of frozen groundfish blocks to the United States.)

Iceland (Contd.):

The rapid growth of the herring fishery has affected both the fleet and use of processing plants. Herring plants in some locations are now idle because the herring have moved elsewhere. At the same time, the trawler fleet has been allowed to become obsolescent.

It is estimated that herring plant operation is about 10 percent of capacity, and that the whole herring catch could be processed in 20 to 30 days if all existing facilities were fully used. Some underutilization of processing facilities, however, is inescapable because of the herring's roving habits. For several years, the herring banks have been moving from the north and south coasts to the northeast and east coasts of Iceland where herring fishing is becoming a year-round enterprise. Consequently the operation of the older herring plants, especially in the northwest, is now precarious because the plants remain idle most of the year.

Problems of Freezing Plants and Fleet

Production in freezing plants, which depend on cod and related groundfish, declined considerably during first-half 1966 due to an inadequate supply of fresh fish. (U. S. imports of frozen fish blocks from Iceland in January-September 1966 were down 17 percent from the 1965 period. The president of the Icelandic Freezing Plants Corporation said that production in some plants decreased by as much as 46 percent compared to 1964.

The modernization of herring vessels continues, but the deep-sea trawler fleet is in financial difficulties, despite high government subsidies. Years ago, the trawlers provided the freezing plants with a steady supply of fish on a nearly year-round basis. Now, however, the trawlers face inadequate catches and other operating difficulties. Some trawlers already have been sold; one has been converted into a herring vessel and another into a freighter. To alleviate these difficulties, proposals are being considered to grant trawlers new fishing grounds and reduce crew size.

The economic dependence on herring has caused increasing public concern about protecting fishing grounds and reserves. Fishermen are asking the government to extend fisheries limits even farther--to adopt con-

servation measures. In early 1966, the Minister of Fisheries prohibited fishing for small herring. (U. S. Embassy, Reykjavik, October 20, 1966, and other sources.)



Denmark

NEW PROCESS RECOVERS OIL, PROTEIN FROM FILLETING WASTE WATER

A new process to recover soluble protein and emulsified fats from filleting waste water is being used on a commercial scale at a large, new, herring fillet plant in Skagen, Denmark. The recovery operation involves concentration of oil and protein by chemical precipitation and flotation prior to heating--and separation of the residue by centrifuge. The process shows a high rate of recovery compared with traditional methods.

It is especially suitable for clarification of waste water from oily fish. Most filleting plants lose valuable residues through the usual washing and cleaning process. Removal of oil and proteins reduces contamination of waters by factory wastes. The oil from fresh fish is of fine quality and usually commands a high price.

How Process Works

First, the waste water is screened and the larger solid particles go to a fish meal factory. The water then goes into a storage tank, then it is pumped into a flotation tank where chemicals are added to precipitate the protein matter. By the addition of fine air bubbles, which become affixed to the free particles, the precipitate is brought to the surface of the flotation tank. Clear water remains below. The concentrated fat and solid matter is skimmed off into a heating tank to facilitate its separation in the centrifuge. The first step is a protein centrifuge, where the solid matter is separated. The fluid then is carried to an oil centrifuge, where the oil is separated from the water. The cleaned oil is carried to storage tanks, and the water is recirculated.

The firm ran tests on waste water from summer herring-filleting operations containing about 2.8 percent oil and 0.9 percent protein. The plant extracted per cubic meter 27.9 kilograms of oil and 7.5 kilograms of

Denmark (Contd.):

protein. By traditional methods, recovery was 25 kgs. of oil and 4 kgs. protein. Winter operations, in which waste water contained only about 0.3 percent oil, gave a recovery of 2.9 kgs. oil compared with 0.5 kgs. by traditional methods.

The biological oxygen demand (BOD) of the waste water is reduced by 85 percent of the original value. The process is automated and requires little manual attention.

The recovery equipment described has been developed by Aminodan A/S, Skagen, Denmark. Write to that firm for additional information. (U. S. Embassy, Copenhagen, November 2, 1966.)



East Germany

1965 LANDINGS UP ONLY 3 PERCENT

The 1965 landings of 231,000 metric tons of fish were only about 3 percent more than the 1964 landings of 225,000 tons. Fresh-water fish landings were small: 11,100 tons in 1965, compared to 10,700 tons in 1964. Most marine fish came from the Northeast Atlantic (128,850 tons) and Northwest Atlantic (92,440 tons).

The good cod year (57,300 tons in 1965; 45,100 tons in 1964) insured higher total landings in 1965--since the traditionally large North Atlantic herring fisheries were poor in 1965--only 79,100 tons, compared to 87,700 tons in 1964. All Atlantic herring was caught in the Northeast Atlantic, while 90 percent of the cod (51,165 tons) was caught in the Northwest Atlantic.

During 1965, the East Germans did not fish in the Central or South Atlantic Ocean. Their expansion into those areas began in 1966.



Bulgaria

1965 LANDINGS WERE UP 30 PERCENT

In 1965, the Bulgarian fishing fleet landed 19,800 metric tons of fish and shellfish--30

percent more than the 13,200 tons of 1964. Crustacean landings of 2,500 tons were down from 1964's 3,300 tons, but fish landings almost doubled--from 9,900 tons in 1964 to 17,300 tons in 1965. The large increases in landings resulted from the high-seas fisheries developed during 1965, with Soviet-purchased stern factory trawlers, off Africa's western coasts--mostly off Walvis Bay.



Italy

JAPANESE ASSESS FROZEN TUNA IMPORT SITUATION

The Japanese Frozen Foods Exporters Association's Special Committee on Tuna Exports to Italy discussed the possible expansion of the frozen tuna 40,000-metric-ton import limit at a minimum tariff. The group decided to focus attention on 1967 export problems, not 1966's, for several reasons: It is impossible to control the exports to Italy in 1966; there is a good possibility that the 15-percent tariff rate (40,000 tons) may be avoided--and, because of market conditions, frozen yellowfin will go to the United States, not Italy.

Export market conditions for frozen albacore and yellowfin for North America are especially favorable. A recent contract was signed to ship frozen yellowfin to Canada at C\$470-\$475 a short ton c. & f.--a \$30 rise in the last 10-20 days. Similarly, the price for albacore has risen to \$520 c. & f.--about \$30 above the end-of-August price. The active buying by United States packers is due to a good summer sale of canned tuna.

Japan Not Italy's Only Supplier

From January-July 1966, Italy imported frozen tuna from countries other than Japan: Taiwan, 3,000 metric tons; Republic of Korea, 1,400-1,500 tons; Australia, 600 tons. Italy plans to import another 2,000 metric tons from those countries through 1966.

Because of a strike at the Sala cannery on the Adriatic (for wages at least 25 percent higher), an increased inventory of tuna, and a possible imposition of the 15-percent tariff over 40,000 metric tons, the plant's buyers will attempt to lower the purchase price for frozen tuna. (Fishery Attaché, U. S. Embassy, Tokyo, October 6, 1966.)



Greece

ATLANTIC CATCH IS UP 14%

From January-August 1966, the Greek fleet in Atlantic waters landed 18,117 metric tons of frozen fish, compared with 16,029 tons in same period of 1965 (up 14 percent). On September 1, the Greek Atlantic fleet of freezer trawlers had 33 vessels in operation; another 3 were preparing for shrimp fishing in the Persian Gulf. The government is formulating plans to establish fishing jetties in Piraeus, Thessaloniki, Cavalla, and Chalkis which would include refrigerated storage. (U. S. Embassy, Athens, October 21, 1966.)



United Kingdom

MOUNTS PROMOTIONAL CAMPAIGN FOR "FISH--THE BIG DISH"

The slogan of a marketing campaign by the British Government's Fish Information Service (FIS) is "Fish--the Big Dish." The British consumer, like the American, often looks on fish as a substitute or supporting course. The FIS is working to change this attitude with an advertising campaign and efforts to get a new look in fish marketing shops. (Fishing News, October 14, 1966.)

MARINE FISH FARMING OF GROUND FISH WILL BE LONG-RANGE PROJECT

Marine fish farming of groundfish species is still a long way off, according to the Brit-

ish White Fish Authority (WFA). A British project to raise plaice and sole in Scottish coastal lochs is continuing, but WFA says it may be at least 10 years before the project makes any contribution to British fish supplies. (Fishing News, London, October 7, 1966.)

DOUBLED ITS FREEZER STERN TRAWLER FLEET IN 1966

At the beginning of 1966, there were 10 large freezer trawlers in the British fishing fleet. During the year, 12 were added. The latest addition was the 224-foot "Coriolanus" christened November 30. All but one of these new vessels are over 210 feet and can hold 400-600 tons of fish. The exception is the 185-foot "Criscilla," an experiment in economy, with a crew of only 21.

NEW FISH-GUTTING MACHINE

A small machine said to be capable of gutting fish at the rate of 25 a minute is being tested by the fishing vessel "Coral Isle." The machine is 12 inches long, 18 inches high and has been patented by a British fish merchant. It was described in the "Fish Trades Gazette," 17/19 John Adam Street, Adelphi, London, W. C. 2, England. (Write to it for more information.)



ANTARCTIC SEALS PLENTIFUL

Although the whales are disappearing, the seals are coming back. Australian biologists working at a station on MacQuarie Island, Antarctica, found that the population of the elephant seal on the island has increased from near extinction 85 years ago to a present population of 100,000. The stable population consists of about 36,000 cows and 4,000 bulls, with about 35,000 young produced each year.

The elephant seal was almost exterminated as a result of commercial sealing operations during the nineteenth century. The population has increased steadily since the commercial killing of seals was halted nearly fifty years ago. (Sea Secrets.)

ASIA

Japan

PURSE-SEINE TUNA FISHING OFF WEST AFRICA IS POOR

The fishing company Nichiro's 3 vessels conducting experimental two-boat purse-seine operations in the Gulf of Guinea off West Africa are encountering poor tuna fishing again after a brief period of improvement in September. Catches in October, averaging 10-15 tons of tuna per vessel per day, were far below the planned production of 25 tons per day. (Shin Suisan Shimbun Sokuho, Nov. 1, 1966.)

PERMITS TRANSSHIPMENT BY PORTABLE-BOAT-CARRYING TUNA MOTHERSHIPS

The Japanese Government recently revised the Frozen Tuna Export Adjustment Regulations to permit portable-boat-carrying tuna motherships operating in the Pacific Ocean to transship their catches for export. Before, only the regular-type tuna motherships and overseas-based vessels were permitted to transship catches in the Pacific Ocean; all other vessels had to bring their tuna back to Japan before export. This meant doubling transportation costs in some cases. But the purpose of this regulation was to assure supply to domestic tuna packers and cold-storage operators. Transshipment was authorized for the portable-boat-carrying mothership fishery because the operation of regular-type motherships had declined--brought on by the difficulties of contracting catcher vessels to fish for them.

Following the revision, Taiyo Fishing Company's 3,700-gross-ton "Banshu Maru No. 5," operating in the South Pacific, would be the first portable-boat-carrying mothership to conduct tuna transshipments in the Pacific Ocean. It planned to deliver its catches to Suva, Fiji Islands, in mid-November 1966. (Katsuo-maguro Tsushin, Nov. 2; Minato Shimbun, Oct. 26, 1966.)

VESSELS TRANSMIT REPORTS FROM YELLOWFIN TUNA REGULATORY AREA

Japanese vessels entering the eastern Pacific yellowfin tuna regulatory area are transmitting reports to the Fisheries Agency in accordance with reporting requirements prescribed in the Japanese tuna regulations. Transmission is proceeding smoothly. Reports received in early November were mostly from vessels that entered the regulatory area after October 21, 1966. (Katsuo-maguro Tsushin, Nov. 2, 1966.)

1966 KING CRAB FISHING ENDS SUCCESSFULLY

The king crab factoryship "Keiko Maru" completed operations in Bristol Bay October 13 after attaining her 1966 production quota of 94,467 cases (48 half-pound cans) of canned crab meat. The "Dainichi Maru", the other factoryship licensed for Bristol Bay, attained her quota of 90,533 cases in September. Both vessels and their accompanying fleets began operations in March. Together, the vessels attained the quota of 185,000 cases agreed upon by Japan and the United States. Japan's 1966 production of canned king crab from all fishing areas was 463,000 cases.

The king crab fisheries are divided into factoryship fisheries and catcher-boat fisheries, the latter conducted in waters near Nemuro on the northeastern coast, and Wakkanai on the northwestern coast of Hokkaido. About 10 percent of the annual production comes from catcher-boat fisheries.

The factoryships, which produce 90 percent, operate in the Eastern Bering Sea (Bristol Bay), Western Bering Sea (off Cape Olyotorski), and in the Sea of Okhotsk. This year's Sea of Okhotsk quota was set at 240,000 cases as agreed upon by the International Northwest Pacific Fisheries Commission. This year, one company conducted trial operations off Cape Olyotorski and produced 38,000 cases of canned crab meat.

More than half of Japan's annual output of canned king crab meat is exported to the United States, the United Kingdom, France,

Japan (Contd.):

and other western countries. Canned king crab meat has consistently been a good money earner for Japan. Recently, however, because of the increase in the Japanese standard of living and the growing prosperity in the country, a strong domestic demand has developed for canned king crab meat. In October 1966 the retail price in Japan was close to \$1.00 a can, about the same price as in the United States. It is expected, therefore, that Japanese exports of canned crab meat will decrease. (*Nihon Keizai*, Oct. 14, 1966, and other sources.)

* * *

LARGE FISHING COMPANY
TO BUILD 300-TON PURSE SEINER

A large fishing company has ordered construction of a 300-ton purse seine vessel at a total cost of about 200 million yen (US\$556,000). Launching is scheduled for February 1967. The vessel will have a power block, refrigerating capacity of 86 tons, and a speed of 11 knots. The firm plans to operate the seiner year-round in the central west Pacific off Guam Island, and the south Pacific off New Zealand, as a replacement for the 240-gross-ton "Kenyo Maru," which operated in the South Pacific in 1964-65. The latter was the first Japanese purse seiner to adopt the power block in 1962. (*Shin Suisan Shimbun* Sokuho, Oct. 26, 1966, and other sources.)

* * *

LARGE OCEANOGRAPHIC
RESEARCH VESSEL LAUNCHED

The largest Japanese oceanographic research vessel, the "Hakuho Maru," 3,200 gross tons, was launched November 1, 1966, at the shipyard in Shimonoseki, southern Japan. Ordered by the Oceanographic Research Institute, University of Tokyo, the vessel is being built at a total cost of 1.65 billion yen (US\$4.58 million). Completion of outfitting is scheduled for early May 1967.

It will accommodate 55 crew members, 32 scientists and technicians, and foreign researchers. Its specifications: total length--86 meters (282 feet); beam--14.8 meters (48.5 feet); draft--7.3 meters (23.9 feet); main engine--four 1,100-horsepower diesel engines; maximum speed--15 knots; cru-

ing speed--12 knots; maximum cruising range--15,000 nautical miles. (*Minato Shim-bun*, Nov. 2, 1966.)

* * *

OBSERVERS ARE ABOARD
SOVIET VESSELS

A 4-man team left Japan for a Murmansk base on October 11, 1966, to board a large Soviet factory stern trawler scheduled to leave for the Northwest Atlantic on October 26. The team--2 scientists from Tokai Fisheries Research Laboratory and 2 representatives of 2 large Japanese fishing companies--will observe Soviet fishing and processing operations. (*Suisancho Nippo*, Oct. 7, reported by U. S. Embassy, Tokyo, Oct. 18, 1966.)

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INCREASES FISH MEAL IMPORTS

Japan had to increase imports of fish meal to supplement her own expanding output between 1960-1964. She did this even in 1965, when domestic production reached 374,100 metric tons. The increases were absorbed by the animal feed industry which doubled its use of fish meal during 1960-1964.

Fish Meal Production, Foreign Trade, Consumption, and Prices, Fiscal Years, 1960-1965						
Item	Fiscal Years					
	1965	1964	1963	1962	1961	1960
 (1,000 Metric Tons)					
Production	374	375	301	323	278	244
Imports	84	122	86	36	38	18
Consumption:						
For mixed feeds	346	371	308	243	218	171
For fertilizers	76	88	72	92	89	89
Exports	13	6	4	18	5	-
 (US\$)					
Avg. import prices (c.i.f.) per metric ton	155.0	134.6	133.3	132.3	121.7	108.4
Number of fish meal factories in Japan	169	165	157	1/	1/	1/
1/Not available.						

Imports and consumption declined slightly in 1965, probably as a result of rising prices and the tight world supply situation. Exports were insignificant in 1960-1965.

* * *

41% OF IMPORTED EDIBLES COMES
FROM 3 COMMUNIST NATIONS

During first-half 1966, Japan imported 76,240 metric tons of edible fishery products,

Japan (Contd.):

Imports of Fishery Products from Communist Countries, January-June 1966						
Product	North Korea	China	USSR	Total	Total Imports	Percentage of Total
..... (Metric Tons)						
Fresh & Frozen:						%
Fish:						
Bonito & tuna...	-	73	-	73	4,721	2
Herring	-	50	3,001	3,051	3,051	100
Spanish mackerel	-	2,824	-	2,824	5,238	54
Sea bass	-	56	-	56	110	50
Hair tails	-	3,636	-	3,636	3,809	95
Croakers	-	2,457	-	2,457	3,187	77
Other fish	-	1,450	558	2,008	5,432	37
Shellfish:						
Shrimp, etc.	-	6,476	4,986	11,462	19,367	59
Other shellfish	-	551	35	586	22,776	3
Not:						
Caviar, etc. ...	-	10	60	70	123	58
Herring	-	15	49	64	201	32
Salted Dried:						
Shellfish	2	42	-	44	1,865	2
Jelly fish	-	1,984	-	1,984	1,984	100
Other	-	368	1,131	1,499	1,526	98
Canned:						
Shellfish	-	50	-	50	135	37
Otherwise Preserved:						
Shellfish	40	1,473	-	1,513	2,714	56
Total	42	21,515	9,820	31,377	76,240	41

of which 31,377 tons (41 percent) came from three Communist countries--China, USSR, and North Korea, in the order named. Fresh and frozen shrimp was the largest volume item--19,367 metric tons, of which 11,462 tons (59 percent) came from those three. (Fishery Attaché, U. S. Embassy, Tokyo, Oct. 21, 1966.)

CANNED CRAB SALES DECLINE IN 1966

Decreased sales of canned crab were reported by the Japanese Canned Salmon and Crab Joint Sales Company. Exports for 1965 and 1966 by country of destination were:

Canned Crab Sales, 1965 and 1966				
Destination	1965 Total	1966		
		To Nov. 1	Future	Total
		(In Cases)		
France	85,000	46,000	35,000	81,000
United States	132,000	38,000	30,000	68,000
United Kingdom	90,000	48,000	-	48,000
Other	37,000	18,000	1/	1/
Total	344,000	150,000	1/	1/
1/Not available.				

1/Not available.

Exports of canned crab in 1966 would be about 100,000 cases less than in 1965, and the difference would occur in lower exports to the United States and United Kingdom. (Fishery Attaché, U. S. Embassy, Tokyo, Nov. 8, 1966.)

RAISE CANNED SHRIMP PRICES

Prices for canned shrimp were raised again by the Canned Shrimp and Crab Joint Sales Company. Price quotations for various sized case packs were:

Canned Shrimp Price Quotations					
Cans/ Case	Size	Type	New	Previous	Beginning of Fiscal Year
..... (US\$)					
24	No. 2	Mix size	9.50	9.00	8.50
48	No. 3	Mix size	11.40	10.80	10.20
24	No. 2	Broken	8.50	8.00	7.50
48	No. 3	Broken	10.20	9.60	9.00

Of 150,000 cases consigned to the Joint Sales Company, 50,000 cases sold at the price at the beginning of the fiscal year, 50,000 cases were sold at the previous price, and the remaining 50,000 cases were to be sold at the new price. Prices rose following the poor 1966 season for "northern" shrimp and the smaller pack. (Fisheries Attaché, U. S. Embassy, Tokyo, Nov. 8, 1966.)



India

SETS FISHING GOALS UNDER
NEW 5-YEAR PLAN

An annual fish catch of 1.53 million metric tons by 1970-71 is the goal of the Indian Government's fourth 5-year plan. A catch of 1.3 million tons in 1964 was reported by the UN's Food and Agriculture Organization, although India estimates its current annual catch at only about a million tons. The 5-year plan calls for new investment in the industry of Rs. 1,130 million (US\$149 million). It calls for almost a threefold increase in fishery exports--to an annual value of Rs. 200 million (\$26.3 million)--by 1970-71.

Technological improvement and expansion of the fisheries cooperatives will be stressed so they may play an increasingly important role in production and marketing. In particular, it is proposed to acquire 200 trawlers, construct 8,000 mechanized vessels, develop fishing harbors, set up more ice and cold storage plants, and provide refrigerated vans for long-distance transport from points of landing to points of consumption.

For inland fisheries, production is to be increased by developing unutilized areas,

India (Contd.):

intensive exploitation of existing culturable waters, and other measures. Facilities for research and training also are to be expanded. (Seafood Trade Journal, Cochin, India, Oct. 1966.)



South Korea

PLANS FISH CANNERIES WITH HELP OF U. S. FIRMS

The Republic of Korea plans to develop, in a joint venture with U. S. firms, marine product canneries and a fishing fleet. The fleet will operate in the fishing grounds south of Cheju Island in the East China Sea where mackerel are plentiful, and in the Southwest Pacific, where skipjack and yellowfin tuna abound.

Under the plan, 60,000 metric tons of mackerel and 20,000 tons of tuna are expected to be caught and canned annually by the processing plants. (Korean Business Review, Sept. 1966.)



North Korea

NEEDS BETTER FACILITIES FOR FISHERY PRODUCTS

North Koreans presently catch 500,000-600,000 metric tons of fish, shellfish, and other aquatic products, First Deputy Prime Minister Kim Il said on October 10, 1966. He made the statement during a major policy speech to the Conference of North Korean Communist Activists.

Despite this large catch, the public's demand is not being met because of poor processing facilities and unsatisfactory marketing and distribution methods. To overcome these problems, fish-processing facilities must be built not only in fishing areas but in consumption (urban) areas. Refrigerated storage facilities will be built in Pyongyang and in other major cities.

In 1955, according to FAO statistics, North Koreans landed 312,000 metric tons of fish-

ery products, about 50-60 percent of the present catch. This growth rate is much smaller than that of South Korea; there, landings of 265,000 tons in 1955 increased by 112 percent to 562,000 metric tons in 1965. (If aquaculture's production is added to the 1965 figure, as North Korea did, then the total South Korean production would be 636,000 tons.)

The Republic of Korea, unlike North Korea, has developed modern fish-processing facilities, purchased many large-powered vessels, and thus established a solid base for a modern fishing industry.



Taiwan

U. S. BUYS OVER HALF FISHERY PRODUCTS

During 1965, the Republic of China (Taiwan) exported NT\$61.0 million worth of fishery products and imported NT\$38.5 million. Almost 95 percent of all exports were shipped from the port of Tainan in southwestern Taiwan; the remaining 5 percent from Taipei. The United States was the largest buyer (NT\$34.7 million), followed by Japan (NT\$25.6 million); exports to other countries--Ryukyu Islands, Hong Kong, Singapore, Thailand, etc.--were negligible. The largest single export item (NT\$36.6 million) was shrimp and other crustaceans; both were imported mainly by the United States (NT\$18.6 million) and Japan (NT\$18.1 million). Fresh and frozen (mostly frozen tuna) fish, the second largest export item (NT\$19.3 million), were bought mostly by the United States (NT\$16 million) and Japan (NT\$3.3 million).

Taiwan's fishery imports in 1965 were NT\$38.5 million; most (NT\$34.6 million) entered at Taipei in north Taiwan. South Korea was the largest supplier of fishery products (NT\$29.8 million), followed by Japan (NT\$7.3 million) and "unidentified countries" (NT\$1.2 million). Cuttlefish made up the largest part of the imports (NT\$27.2 million), coming mostly from South Korea (NT\$26.5 million). Other major imports were seaweeds (NT\$6.9 million) from Japan and South Korea, and fish fry (NT\$1.4 million) from Japan. (The Trade of China, 1965, pp. 205-212.)

Note: NT\$40.10 equal US\$1.00.

Taiwan (Contd.):

PRODUCERS MAY ESTABLISH
JOINT TUNA SALES SYSTEM

Leading tuna producers in Taiwan may organize a joint sales company to handle export tuna. Despite the spectacular advance made by the industry with government assistance, the lack of sufficient marketing experience by fishery firms has caused producers to sell catches for immediate gains or at low prices. The establishment of a joint sales system is considered likely to exert a significant effect on tuna sales. (Katsuo-maguro Tsushin, Nov. 2, 1966.)



Malaysia

ANNUAL LANDINGS CONTINUE TO RISE

Malayan fishery landings have risen steadily in recent years despite the impasse over trawling in Indonesian waters that has prevented greater progress in the fishing industry. The 1965 catch of 198,000 metric tons (worth about M\$168 million) was 31 percent above the 1961 figure. The increase is believed due mainly to mechanization and the use of larger craft.

As vessels become larger, traditional methods of navigation and fishing will no longer suffice. The Malayan Government intends to prepare for this by setting up a Fisheries Training Center in Penang. (U. S. Embassy, Kuala Lumpur, Sept. 13, 1966.)



Thailand

EXTENDS TERRITORIAL LIMITS

The King of Thailand signed a proclamation, published October 18, 1966, establishing a 12-mile territorial limit measured from the low-water line.



Australia

INTEREST IN FISH MEAL
PRODUCTION RISES

Consumption of fish meal has increased twentyfold in the past 10 years, due mainly to its value as a high-protein food for fattening poultry and pigs. No serious attempt has yet been made to establish a large-scale industry in Australia, which relies heavily on imports. But interest is quickening. The Fisheries Branch, Commonwealth Department of Primary Industry, recently studied prospects for a local industry.

Consumption of fish meal rose from 1.3 million lbs. in 1956/57 to 26.7 million lbs. in 1964/65. During the five-year period to 1963/64, pork production rose by 20 million lbs., and poultry meat production by 11 million lbs.

Domestic production of fish meal did not increase at the same rate as consumption between 1956/57 and 1964/65. Today, it supplies only about 9 percent of local requirements. Existing plants rely mainly on offal from processing factories. The fish meal produced is only about 50 percent protein--compared with 65 percent in imported meal.

Imports from S. Africa

Australia imported 24.3 million lbs. of fish meal worth \$1.2 million in fiscal year 1964/65. South Africa was the main supplier. The price rose to \$A220 (about US\$245) a short ton for 65 percent meal.

It is anticipated that the demand for fish meal will continue to increase to satisfy the growing broiler industry, but unless domestic production increases significantly, most of its requirements will be imported. Any significant increase in production can only be achieved by exploiting fish specifically for fish meal.

Unassessed stocks of pilchards and other fish suitable for reduction are in waters around Australia. The present demand and high price for fish meal has stimulated interest in a fish meal industry to exploit them.

* * *

Australia (Contd.):

TUNA FISHING GOOD IN 1966

The total tuna catch in 1966 was about 9,164 short tons, most destined for the United States.

South Australia's record-breaking tuna catch for the 1966 season was 6,688 short tons, about 625 tons higher than the 1964 record. One reason was that 10 more vessels were used, bringing the fleet to 31.

Tuna fishing is now a vital part of the fishing industry, although it was not widely practiced until the early 1950s. An aerial survey of tuna schools off the New South Wales south coast in 1936 aroused interest in tuna fishing. It was tried in 1937, with no significant catches.

Learned Pole-and-Line Bait Method

In 1950-51, the Australian Federal Government sponsored the visit of a 53-ft. American-Fijian tuna clipper with a trained crew to instruct local fishermen in the pole-and-line-bait method of fishing. Australian fishermen rapidly became expert and the tuna catch rose dramatically.

Fishermen concentrate on the southern bluefin tuna, which has a juvenile weight of 20-80 lbs. The young tuna swim in schools and fishermen can pole-catch many in little

time. As the tuna grow, they move into deeper waters and are caught largely by the Japanese using the long-line method. ("South African Shipping News and Fishing Industry Review," Oct. 1966.)



Fiji Islands

TUNA BASE CONTRACTS
TAIWAN AND ROK VESSELS

The Fiji Islands tuna base has contracted 8 Taiwanese and 7 South Korean vessels to fish for it. The base is a joint Japanese-Fijian venture established in 1964 by the South Pacific Fishery Cooperative Association and the Pacific Fishing Company and operating 10 Japanese tuna vessels.

The 15 vessels, ranging from 80-170 gross tons, will begin operations at the end of 1966. Fishing off the Fiji Islands, unfavorable in November because of the seasonal change in the fishery, normally improved in December. Tuna catches in nearby waters now are averaging 0.8 ton per vessel per day, mostly albacore. (*Suisancho Nippo*, Nov. 4, 1966.)



AUSTRALIA DEVELOPING PEARL CULTURE INDUSTRY

The Australian pearl culture industry, started in 1956, is still developing. There are now 11 culture farms scattered across Northern Australia from Exmouth Gulf to Torres Strait, in various stages of production, and they employ 82 Japanese and 153 Australians.

Pearls are being cultured in the large Australian pearl oyster (*Pinctada maxima*) which can produce a round pearl up to 18 mm. ($\frac{3}{4}$ inch) in diameter in from 2 to 3 years--about half the time it takes in Japan where the culturing technique was perfected. The Japanese culture the small Akoya oyster (*Pinctada martensii*) which produces a pearl up to 11 mm. ($\frac{7}{16}$ inch) in diameter in 4 to 7 years.

Japan has 3,000 culture farms which in 1963 produced 79 metric tons of pearls for export, worth £A23 million (US\$51.3 million). The United States, Switzerland, West Germany, and Hong Kong were main buyers.

Australian cultured pearls are sent to Japan where rounds are graded and half rounds processed, then re-exported to world markets where they have a high reputation for size and quality. (*Australian Fisheries Newsletter*.)

AFRICA

South Africa

SHOAL CATCH WAS DOWN IN 1966

The Cape west coast shoal fish catch, January-August 1966, was somewhat less than for the same period in 1965 (see table).

Species	1966		1965	1964
	Aug.	Jan.-Aug.	Jan.-Aug.	Jan.-Aug.
	(Short Tons)			
Pilchards	5,746	125,766	222,920	282,301
Maasbanker	3,987	26,419	44,753	22,121
Mackerel	-	61,285	43,967	57,222
Anchovy	25,271	155,452	134,807	25,709
Red-eye herring . . .	-	4,980	-	-
Total	35,004	373,902	446,447	387,353

In 1965, the season for pilchard, maasbanker, and mackerel closed at the end of July, but anchovy fishing continued until the end of September. The 1966 shoal fishing season, scheduled to end on August 31, was extended through September. In 1964, the pelagic fishing season closed at the end of July.

The August 1966 catch yielded 7,766 short tons fish meal, 116,000 imperial gallons of fish-body oil, and 456,420 lbs. of canned maasbanker.

In South-West Africa, the August 1966 catch was 57,750 tons pilchards and 27 tons of anchovy. This brought the total catch for the first eight months of 1966 to 680,186 tons. August fish meal production was 14,451 tons, bringing the total to 163,707 tons. ("South African Shipping News and Fishing Industry Review," Oct. 1966.)

DRY OFFLOADING REDUCES EFFLUENT AT FISH MEAL PLANTS

Dry fish offloading systems help to cut the amount of effluent from fish meal factories. "All fish factories discharge considerable quantities of water which has been used for offloading or washing fish," says the assistant director, Fishing Industry Research Institute. He adds: "Originally trouble rose at Hout Bay, south of Capetown, where offloading water containing oil and other soluble matter was discharged into the Bay. When the currents and the winds were unfavorable

some of this used to wash up on to the beach. Then the factory installed a dry offloading system--the biggest installation of its kind in the world. It operates like a colossal vacuum cleaner. Hoses with a diameter of 10 inches simply suck up the fish. However, it is suitable only for fish intended for fish meal, as it damages fish too much for canning."

The usual method of offloading pelagic fish is to pump water into the boat's hold and then to suck it out, taking the fish with it. (The Cape Town Times, Shipping Supplement, Oct. 7, 1966.)



South-West Africa

PILCHARD FILLETS ARE EXPORTED

An export market has been established for frozen South-West African pilchard fillets. The Fishing Industry Research Institute has developed a way of freezing them so that rancidity is reduced to a level that insures a shelf life of several months. Without this treatment, the oils in frozen pilchard would turn them rancid in a matter of weeks. (The Cape Town Times, Shipping Supplement, Oct. 7, 1966.)

PILCHARD EGGS ARE SCARCE

An apparent shortage of pilchard eggs off Walvis Bay in 1966 has been worrying scientists manning research vessels operating from that port. The Chief Fisheries Officer of the South-West African Administration, Marine Research Laboratory at Walvis Bay, said it was difficult to attribute this development to any particular cause at this stage. But foreign fishing trawlers do not normally operate in the spawning grounds, so the lack of eggs could not be ascribed to these vessels. ("South African Shipping News and Fishing Industry Review," Oct. 1966.)

16 NATIONS FISH OFF COAST

Vessels from all over the world fish off the coast of South-West Africa. At first the

South-West Africa (Contd.):

foreign trawlers caught white fish, but later extended their activities to pilchard. This was especially true of the Soviet fishing fleet. Fifteen countries, plus South Africa, operate off the South-West Africa coast:

USSR: It has by far the most modern fishing fleet, which catches pilchard, white fish, and crab. It was estimated that the Russians would catch about 150,000 metric tons of pilchard in 1966. At times, the fleet numbered over 40 vessels and operated mainly north of Walvis Bay. It is supplied by depot ships and tankers shuttling between Russian ports and the fishing grounds. Most fish products are taken back to the Soviet Union, although some is sold to West Africa.

Spain: A fleet of about 50 vessels, second largest, specially designed for African waters. They catch hake, all sent back to Spain. They make regular use of Walvis Bay for stores, oil, water, and transshipping to reef-er vessels.

Japan: A sizable fleet catches white and red fish, which are sent back to Japan. The vessels use Cape Town as a base.

West Germany: 3 ultramodern trawlers catching hake.

France: Small trawlers for spiny lobster.

Ghana: 3 Soviet trawlers on charter and manned mainly by Russian crews.

Israel: 2 modern trawlers operating between Walvis Bay and Cape Town. The fish is frozen and sent back to Israel.

Belgium: One trawler operating under charter to a South-West Africa fishing concern and catching hake for the Congo and Belgium markets.

Poland: A small fleet catching mainly white fish.

East Germany: One stern trawler catching white fish.

Bulgaria: Several trawlers catching both white fish and pilchard.

South Korea: A fleet of 20 tuna long-liners operating in the South Atlantic between

200 to 400 miles of Walvis Bay. They make regular use of Walvis Bay for stores, oil, and fresh water.

Nationalist China: A small fleet of tuna long-liners, also operating further out to sea off the coast.

Holland: Several stern trawlers. There is talk they may leave to find other fishing grounds nearer home.

Italy: 3 large stern trawlers catching white fish.

South Africa: In addition to white fish trawlers, there is the world's biggest floating factoryship, the "Willem Barendz." Operating outside the 12-mile fishing limit, she is expected to catch about 110,000 tons of pilchard a year. ("Namib Times," Walvis Bay, South-West Africa, Sept. 30, 1966.)



Morocco

SARDINE CATCH IS UP, EXPORTS DOWN

Among the recent measures taken by the Moroccan Government to revive the ailing fishing industry was the reduction of the cost of cans and packing oil used by canneries. The fixed price paid by canneries to boat owners for raw fish was also reduced by the Government to make the Moroccan fish pack more competitive in the world markets. It is too early to see if increased export sales will result from these measures.

Early reports of the actual catch indicate that the 1966/67 season may be a record one in total catch of sardines. However, statistics for 11 months of the 1965/66 season show that exports of canned fish were lower than in any of the last 10 seasons. Morocco faces difficult problems in reestablishing its canned fish in world markets.

Fresh fish sales in local markets (an important source of income to fishermen) have continued to drop because the European population, principal consumer of fresh fish, declines. The Casablanca wholesale fish market accounted for the sale of US\$2 million in fresh fish during the first nine months of 1966. Agadir supplies over half the fresh fish for the Casablanca market. (U.S. Embassy, Rabat, Nov. 21, 1966.)



Foreign Fishing Off U. S. Coasts in October and November 1966

IN NORTHWEST ATLANTIC

Soviet: Weekly sightings showed fleet ranged between 50 and 60 fishing and support vessels through October, the same as at the end of August. However, the greatest number of individual vessels sighted during October was 72. Not all 72 were present throughout the month.

Fleet size during August-October 1965 was about the same as that during same period in 1966. Beginning in mid-October 1965, however, the fleet decreased rapidly. By month's end, only 10 fishing and support vessels remained on Georges Bank. The greatest number of individual fishing and support vessels sighted in October 1965 was 74.

In October 1966, the fleet was scattered but generally concentrated in two main groups: (1) Between 15 and 20 vessels (mostly large side trawlers of "Pioner" class and several processing ships) were located in 10-15 mile area 40 miles south of Nantucket Island. Heavy to moderate catches appeared to be primarily whiting (silver hake). The Soviets maintained a sizable fleet in that area since early September, but it had declined by late October. (2) A larger concentration, 30-40 vessels (mostly stern trawlers and some fish transports) were dispersed along the northern slopes and inner shoals of Georges Bank, 80 to 120 miles east of Cape Cod. Huge catches of fish, primarily herring, filled the open storage areas on the decks. Numerous trawls were bulging with catches estimated in excess of 30,000 to 40,000 pounds each. Most stern trawlers had their dehydration plants operating, an indication that they were also manufacturing fish meal and oil.

Soviet emphasis on catching herring in 1966 contrasted with their small herring catch on Georges Bank in 1965, but it was similar to their extensive herring fishing during August-September 1964.

Late in October, both fleet concentrations shifted. Those vessels fishing south of Nantucket Island moved north to the Cultivator Shoals area; most stern trawlers extended operations eastward beyond 100-fathom curve between northeast peak of Georges Bank and Browns Bank (south of Nova Scotia).

On October 11, the luxury tourist liner "Ivan Franko" was sighted about 12 miles east of Chatham, off Cape Cod (Massachusetts). This recently constructed ultramodern passenger vessel brought replacement crews for the factory stern trawlers fishing on Georges Bank and off Newfoundland. Several hundred fishermen were exchanged. Three stern trawlers, BMRTs "Topaz," "Safir," and "Perekat," fishing as far as Nova Scotia and Newfoundland, also came for replacement crews. The Ivan Franko, which came from Odessa, left 2 days later and returned home.

The fishery research vessel BMRT-395 "Atlant" fished about 5 miles east of the main group of vessels. No catch was observed.

Polish: Five factory stern trawlers were sighted on Georges Bank early in October operating among Soviet herring fleet. By mid-month, the trawlers had shifted to eastern Nova Scotia and Newfoundland fishing grounds.

East German: Two stern trawlers fished intermittently on Georges Bank during October, one of which first appeared early in September 1966. By month's end, both returned to their traditional fishing grounds off Canada.

Romanian: One stern trawler was sighted among Soviet fleets early in October.

IN GULF OF MEXICO

Soviet: No fishing vessels were sighted near U. S. coasts. Several large stern trawlers of "Tropik" class were sighted in Straits of Florida on way to newly opened Soviet fishing grounds in southwestern Atlantic off South American coast. Those vessels are based in the Havana fishing port, which became operational in early September 1966.

OFF PACIFIC NORTHWEST (Washington and Oregon)

Soviet: The fleet in October 1966 consisted of 70-80 vessels catching primarily hake. Observers noted more ocean perch and other rockfish in the catches than before.

During first-half October, greatest concentration of vessels was off Oregon; later, they moved back off Washington coast. For week ending October 27, 50 side trawlers and 14 factoryships were sighted off Washington

coast, and 8 stern and 1 factoryship off Oregon coast. The fleet moves between coasts of the two States seeking the greatest concentration of fish.

OFF ALASKA

Soviet: The fishing effort off Alaska in October 1966 continued to decline--from over 20 vessels early in the month to about 14 by month's end.

Pacific ocean perch operations in Gulf of Alaska were conducted by two stern factory trawlers off Southeastern Alaska throughout October. Two other stern trawlers were active in the Shumagin Islands area during first half of month.

Perch operations along Aleutian Islands were reduced from about 6 stern factory trawlers and a few support ships to 4 stern trawlers and a refrigerator vessel located south of Fox Islands in eastern Aleutians at month's end.

Soviet shrimping in the Shumagin Islands declined from 7 medium freezer trawlers and a few support ships in early October to about 5 medium trawlers by month's end.

Japanese: The vessels off Alaska declined to about 14 by mid-October and remained at about that level.

The decline of factory trawlers fishing for ocean perch in Gulf of Alaska continued. By October's end, only 3 vessels remained: the "Kirishima Maru" off coast of Southeastern Alaska, and the "Akebono Maru No. 72" and the "Daishin Maru No. 12" on Albatross Bank.

A new factory trawler, the "Zuiyo Maru No. 2," arrived south of Fox Islands in early October and fished for ocean perch. Later, she was joined by two factory trawlers, the "Tenyo Maru No. 3" from Japan and the "Kyo-shin Maru No. 55" from the Gulf of Alaska.

The king crab fleet in the eastern Bering Sea achieved its quota and ended operations by mid-October.

Long-line vessels fishing sablefish off Alaska increased from 2 in early October to 8 by month's end. Two long-liners, the "Tenyo Maru No. 18" and the "Tenyo Maru," were off coast of Southeastern Alaska. The

"Fukuyoshi Maru No. 15" was southwest of Chirikof Island. Four Japanese long-liners were north of eastern Aleutians--the "Koto-shiro Maru" No. 18, No. 25, No. 28, and No. 30. The "Fukuyoshi Maru No. 35" fished north of central Aleutians.

PACIFIC NORTHWEST

Boarding Soviet Vessel: On October 25, the U. S. Coast Guard and BCF officers boarded 2 Soviet vessels: one (the medium side trawler "Azimut") had lost her propeller screw; the other (the salvage tug "Dekabrist") towed the trawler into calmer waters off Neah Bay (in Strait of Juan de Fuca, Washington) where repairs could be made.

During boarding, the Soviet Fleet Commander, V. M. Sergeev, said Soviet fishery patrol vessels will strictly enforce compliance with the new U. S. fishery limit of 12 miles. Any Soviet vessel found within 12 miles of the U. S. coast will be punished with one week's loss of pay for crew. Soviet fishermen confirmed that fishing off Pacific Northwest was still good, but less so than earlier.

November 1966

IN NORTHWEST ATLANTIC

Soviet: During early November 1966, fishing and support vessels on Georges Bank fluctuated between 15 and 20, a marked decrease from the 50-60 during October 1966. By end of November, almost all vessels left the Georges Bank fishing grounds, most of them for southern part of Grand Bank (off Canada).

Fleet movements of this type are not uncommon at that time and the absence is probably only temporary. A similar decline occurred in 1965. But late in December, when the Soviets shifted operations to southern New England areas (Hudson and Block Canyon), the number increased again.

During November, 16 individual vessels were identified as 10 factory stern trawlers, 1 processing and refrigerated freezer trawler, 3 refrigerated fish transports, and 2 medium side trawlers. This compares with 72 vessels sighted during October 1966 and 16 in November 1965. The vessels were scattered along northern edge of Georges Bank (Georges Basin) and southwest slopes

of Browns Bank (Fundian Channel) 120 to 200 miles east of Cape Cod. Only limited catches of fish were observed. Based on visual observations, fleet location, and depth of water (100-160 fathoms), it appears that argentine (herring smelt) and possibly some mixed groundfish were principal species caught.

No Polish, East German, or Romanian fishing vessels were sighted on Georges Bank during November.

OFF MIDDLE AND SOUTH ATLANTIC

Japanese: A 1,000-ton trawler was reportedly exploring off the U. S. Atlantic coast, including waters from Newfoundland to Argentina. Initial explorations will seek out resources off Florida coast. Future plans depend on results.

Soviet: Fishing vessels were not sighted off Middle and South Atlantic coast in October-November 1966.

OFF ALASKA

Japanese: About 12 vessels were active off Alaska's coast during most of November.

The "Kirishima Maru" fished for Pacific ocean perch off Southeastern Alaska the first two weeks. It is believed she returned to Japan about mid-month and that the "Taka-chiho Maru" began fishing there shortly thereafter. The "Akebono Maru No. 72" and "Daishin Maru No. 12" fished for perch on Albatross Bank the first week. The "Akebono Maru No. 72" moved to north of central Aleutians during second week. It is believed the Daishin Maru No. 12 returned to Japan about mid-month. The "Ryuyo Maru" presumably began operations on Albatross Bank about mid-November. The "Tenyo Maru No. 3," "Zuiyo Maru No. 2," and "Kyoshin Maru No. 55" fished for perch south of Fox Islands in eastern Aleutians most of the month. The Tenyo Maru No. 3 docked at Seward near end of November to take on fuel and other provisions. The "Inase Maru No. 5" began perch operations north of central Aleutians in early November and was joined shortly thereafter by the Akebono Maru No. 72 from Gulf of Alaska.

The "Fukuyoshi Maru No. 15," a long-line vessel, fished for sablefish near Chirikof Island in Gulf of Alaska during first week. The long-liners "Kotoshiro Maru's" No. 18,

No. 25, No. 28, and No. 30 and "Fukuyoshi Maru No. 35" fished for sablefish along north side of eastern and central Aleutians during most of November. Those vessels may have returned to Japan by month's end.

Soviet: Its vessels ranged from 14 to 17, about the same as October.

Pacific Ocean perch operations in Gulf of Alaska were conducted by 4 large factory stern trawlers and 1 medium freezer trawler. Two of the stern trawlers fished off southeastern Alaska in early November and then, presumably, moved south.

Four stern factory trawlers, 1 medium side trawler, and 1 refrigerator carrier were active in the perch fishery south of Fox Islands in eastern Aleutians during early November. By month's end, only about 3 stern trawlers continued operations.

The Soviets doubled their effort in the Shumagin Islands shrimp fishery. Their vessels increased from 5 trawlers in early November to 9 trawlers, 1 refrigerated carrier, and 1 tanker by month's end.

OFF PACIFIC NORTHWEST (Washington and Oregon)

Soviet: Number of vessels ranged between 61 and 75. The greatest number worked off Washington coast from Grays Harbor to Cape Flattery, with major effort off Point Grenville and Destruction Island. From 40 to 65 vessels were sighted at one time off the Washington coast; off Oregon, the greatest number was 13.

Off Oregon the Soviets operated stern ramp trawlers and caught primarily Pacific hake, but catches were not as good as those further north.

The fleet had been following the seaward migration of hake so vessels in November were 15 to 30 miles off coast. They still were making fair-to-good catches.

Japanese: One 550-gross-ton trawler was dispatched from Japan on December 1, 1966, to work southward from waters off northern Washington to San Diego, California. The trip will last 4 months and involve about 90 days of actual fishing. The same vessel explored off Vancouver Island, British Columbia, in October and early November and took some Pacific hake and rockfish.



ARTICLES

HISTORY OF SCALLOP AND CLAM EXPLORATIONS IN THE GULF OF MEXICO

By James S. Carpenter*

Extensive scallop and clam resources have been outlined during BCF explorations in the Gulf of Mexico during the past 9 years. Greatest concentrations of calico scallops (*Aequipecten gibbus*) were off Cape San Blas, Fla., Gulf Shores, Ala., and St. George, Fla., in waters shallower than 20 fathoms. Productive beds of hard clams (*Mercenaria campechiensis*) were found off Pas-a-Grille, Venice, San Carlos, and Cape Romano, Fla., in 3 to 4 fathoms.

Small concentrations of paper-shell scallops (*Amusium papyraceus*) and Gulf clams (*Pitaria cordata*) were discovered offshore in the northwestern Gulf, from Ship Shoal, La., to Laguna Madre, Mexico.

Since 1954, BCF research vessels have carried out intermittent scallop and clam explorations in the Gulf of Mexico--primarily to locate clam and scallop beds on the Continental Shelf and to develop more effective harvesting methods. Another aim has been to determine if clams are again abundant in areas where, formerly, they were taken in large commercially significant amounts. This report documents commercial fishing efforts in the Gulf, outlines exploratory work accomplished, and indicates steps needed to continue the development of a commercial scallop and clam industry. Background material on early calico scallop explorations by BCF's research vessels and commercial fishing vessels was extracted from Bullis and Ingle (1959).

CALICO SCALLOPS

When the Tortugas shrimp grounds were discovered and fished in late 1949 and early 1950, the shrimp trawls took relatively large amounts of calico scallops (*Aequipecten gibbus*). The interest of the fishing industry was stirred, but only momentarily. Scallop catches decreased as the shrimp grounds were more closely delineated and fewer try nets were dragged in shallow water; the fleet then caught few scallops.

The first explorations specifically for commercial concentrations of scallops in the Gulf were conducted in April 1954 by BCF's

exploratory fishing vessel "Oregon" off southwest Florida (table 1). A modified, 4-foot, Biloxi-type oyster dredge and 40-foot shrimp trawls were used. No scallops were caught, although the Oregon dragged where its shrimp trawls had taken scallops in 1951. Apparently the scallops had either moved or died.

In July and August 1955, the commercial trawler "Goodwill" explored north of the Middle Grounds as far west as Cape San Blas. Several try-net drags, south of Cape St. George, caught calico scallops in 25 to 50 fathoms. The number of good-size scallops indicated that an extensive bed lay between the offings of Cape San Blas and Cape St. George.

The commercial vessel "Debbie K." explored the 10- to 30-fathom area off Panama City and Apalachicola, Fla., for scrap fish in fall 1955. It found calico scallops heavily concentrated in several areas, and it stopped trawling in some places because the large scallop catches impeded the efficiency of fish trawls. A catch of 25 bushels was brought to Panama City for shucking and marketing trials, but the facilities were not capable of handling it.

To supplement the rather uncertain supply of bay scallops (*Aequipecten irradians concentricus*) and to allow a longer period of production each year, a fishing firm in Pan-

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Table 1 - Bureau of Commercial Fisheries Explorations for Scallops and Clams in the Gulf of Mexico

Research Vessel	Cruise No.	Date	Area Covered	Type Gear Used
Oregon	22	3/31-4/23/54	Northeast and eastern Gulf	Oyster dredge and shrimp trawl
Oregon	43	2/5-2/21/57	North-central to eastern Gulf	Scallop dredge
Oregon	44	3/5-3/21/57	North-central to northwestern Gulf	Scallop dredge
Silver Bay . . .	2	7/12-7/29/57	Northeast and eastern Gulf	Scallop dredge
Silver Bay . . .	3	8/14-8/29/57	Northeast and north-central Gulf	Quahog dredge
Silver Bay . . .	10	7/17-8/3/58	Northeast and north-central Gulf	Scallop dredge
Silver Bay . . .	13	1/13-1/15/59	Northeast Gulf	Shrimp and midwater trawls
Oregon	67	5/27-6/2/60	North-central Gulf	Scallop trawl
Oregon	68	7/12-7/18/60	North-central Gulf	Scallop trawl
Oregon	70	9/6-9/23/60	North-central Gulf	Scallop trawl
Oregon	81	9/11-10/2/62	North-central and northwestern Gulf	Tumbler and quahog dredges
Oregon	83	11/28-12/21/62	Northeast Gulf	Tumbler and quahog dredges

ama City, Fla., began small-scale exploratory fishing for calico scallops offshore early in 1956. It made monthly trips to locate scallops and to observe their size and growth.

In February 1957, the Oregon made 54 scallop dredge drags between Pensacola and Cape St. George; the BCF-chartered vessel, "Silver Bay," continued the work in July and completed about 30 drags between Cape San Blas and Cape St. George. The gear used was an 8-foot, "Georges Bank" type sea-scallop dredge, constructed with 2-inch rings. The best catch was 6 bushels per 30-minute drag, but it was discovered later that 80 to 90 percent of the Silver Bay's scallop catch was being lost through spaces between the rings. Comparative drags made in August with this gear, which had been equipped with a 2-inch-stretched-mesh liner, took capacity catches (about 40 bushels) per 15-minute drag.

During the 1957-58 winter, vessels of the Panama City firm found rather dense populations of small scallops extending about 25 miles south-southeast of St. Andrews Bay. The bed lay in 6 to 20 fathoms, was 5 to 10 miles wide, 10 miles long, and was apparently the same one found by Debbie K. It extended 3 miles west of St. Joe Buoy to south of St. Andrews Bay Old Pass. There were heavy concentrations of scallops but they were not large enough for commercial use until February 1958. In March 1958, two Panama City boats started working the grounds. Four boats worked in early April. Catches were landed in Panama City, and all scallops were shucked by hand. One tub of unshucked scallops (about 500) yielded about 5 pounds of meats. A gallon of meats was produced by $1\frac{1}{2}$ tubs of scallops. Production of scallop

meats during spring and summer 1958 was 1,200 to 2,000 gallons per week.

Fishing was no longer considered profitable in September 1958 because of the poor market for scallops and the large number of scallop meats needed to produce a pound of meat. The size of the adductor muscle appeared to decrease during and after spawning. In late summer, presumably after spawning, the animals die. These conditions made enlargement of the fishery unattractive, and no boats joined the fleet of four.

Although they were produced in limited numbers as early as 1958 in the Gulf, calico scallops were grouped with and shown as bay scallops in "Fishery Statistics of the United States" until 1962; therefore, the true value of the calico harvest cannot be given before 1962. It is known, however, that the stocks discovered by the Oregon and Silver Bay were fished commercially in 1958; production was 102,500 bushels with ex-vessel value of \$102,500. Production of calico scallops in 1962 was 3,935 bushels, valued at \$4,882 (Power and Lyles, 1964). In 1963, production was only 50 bushels, valued at \$44 (Lyles, 1965).

HARD CLAMS

Schroeder (1924) reported that probably the largest bed of hard clams (*Mercenaria campechiensis*) in the United States was off southwest Florida near Ten Thousand Islands. He estimated a bed about 40 miles long and 5 miles wide, with area of 150 square miles. Continued explorations by BCF vessels have shown this bed extends from Ten Thousand Islands area to St. Petersburg, and that an area of about 200 square miles now produces

clams. The shoreline slopes very gradually and the depth is less than 12 feet in many places 4 to 5 miles offshore (Tiller, Glude, and Stringer, 1952). In 1943, a fishery marketing specialist of the U. S. Fish and Wildlife Service visited the Ten Thousand Islands area. He estimated potential production was almost unlimited and an abundance of 1 bushel of clams per 6 square yards dredged (Tiller, et al., 1952).

Although hard clams had been fished for many years in the Gulf with rakes, hoes, tongs, grabs, and by hand for home consumption, they were not fished commercially until the late 1880s. From 1889 to 1915, Key West boats made occasional trips to the Ten Thousand Islands area to harvest clams during the spring, summer, and fall. Catches landed in Key West varied from 10,000 to 25,000 clams annually. The average weight of a clam was 1 pound (Schroeder, 1924).

The clam stocks of the Ten Thousand Islands area were fished commercially with a conveyor-belt dredge (continually modified and improved) from 1913 to 1947. The dredge was essentially a large wooden scow, about 30 by 80 feet, with a rectangular opening in the bottom through which the dredge belt operated. Clams were washed from the bottom by high-pressure jets of water and brought to the surface by a conveyor belt (Tiller, et al., 1952). Clams taken by the dredge were shucked and used for canned chowder, minced clams, and clam juice. "The annual catch of the dredge from 1943 to 1946 was 30,000, 50,000, 78,000, and 25,000 bushels. In 1947, clams were so scarce that operations halted" (Tiller, et al., 1952).

Hard clams have been found also from Charlotte Harbor to lower Tampa Bay and Clearwater, but most beds are small and clams are taken only for home use. At one time, Matanzas Inlet, Charlotte Harbor, and inshore waters near Englewood supported small fisheries, but when the beds were depleted, the operations became unprofitable (Tiller, et al., 1952).

Despite the well-established fishery for hard clams off southwest Florida during the 1920s, commercial harvesting through 1960 fell to less than 20,000 pounds annually (Rosen and Robinson, 1961). This amounted to 2,923 bushels valued at \$5,462 (Power, 1963). Although an upsurge in the industry in 1962 netted 26,664 bushels for \$50,172 (Power and

Lyles, 1964), the increase was only temporary; the harvest dropped to 874 bushels, valued at \$2,331, in 1963 (Lyles, 1965).

EXPLORATORY FISHING AND GEAR METHODS

During BCF explorations, scallops were harvested with modified 5- to 8-foot scallop and tumbler dredges, described by Posgay (1957) and Bullis and Cummins (1961), and 25-foot scallop trawls similar to those described by Rivers (1962).

Hard clams were fished with modified 13-, 14-, and 22-tooth "Fall River" dredges with 2-inch-stretched-mesh liners.

Most drags for both scallops and clams were for 15 or 30 minutes. Dragging speeds varied between 2 and 2½ knots.

The Oregon and Silver Bay searched for scallops and clams. Both vessels have relatively deep drafts and could not explore for clams in shoal water areas inside 3 fathoms.

EXPLORATIONS

Calico Scallops

Although BCF and commercial-vessel explorations in the early 1950s disclosed calico scallops, commercially significant catches were not made until 1957. In February and July 1957, the Oregon and Silver Bay, using scallop dredges in 17 to 25 fathoms off Cape San Blas, made several promising catches.



Fig. 1 - About 15 bushels of calico scallops dumped from Georges Bank scallop dredge onto deck of Silver Bay.

As a result, BCF planned future explorations there.

In July 1958, the Silver Bay made 43 drags with scallop dredges in the Cape San Blas area and caught almost 20,000 pounds, or about 275 bushels of scallops (fig. 1). Eleven 15- to 30-minute drags, centered around lat. $29^{\circ}51'$ N., long. $85^{\circ}35'$ W., caught over 211 bushels; 1 drag netted 40 bushels, and 2 drags 30 bushels each. Scallops were concentrated at 11 fathoms. The main bed appeared to run 10 miles in northerly direction to south of Panama City. The scallops averaged about $2\frac{1}{2}$ inches in diameter, yielded about 2 quarts of meats per bushel. Scallops averaging $2\frac{3}{4}$ inches in diameter were present in deeper water. Texture and taste were comparable to northern bay scallop. Bullis and Ingle (1959) also reported high catch rates for commercial boats during same period. In 1959, however, that area was almost completely devoid of scallops; commercial operations were abruptly curtailed.

In July 1958, the Silver Bay dragged about 20 miles east-southeast of Cape St. George and discovered an extensive bed of scallops.

They averaged 1 inch in diameter, in 10-15-fathom depths. Catch ranged from 1 to 40 bushels per 30-minute drag. A less extensive bed of small scallops, $\frac{3}{4}$ to 1 inch in diameter, was found midway between Mobile, Ala., and Pensacola, Fla., in 10 to 15 fathoms.

In January 1959, the Silver Bay located an extensive bed of 1 to $1\frac{1}{2}$ -inch scallops between Mobile and Pensacola in 16 to 20 fathoms. On two cruises in 1960, off Gulf Shores, Ala., the Oregon made commercially significant catches. Scallops were fairly evenly distributed between 15 and 17 fathoms, but extensive, heavy concentrations were not located. In July 1960, 19 drags in 15 to 17 fathoms caught 2,680 pounds, or 38 bushels; in September 1960, 4 drags in 16 fathoms took 52 bushels; one 30-minute drag caught 40 bushels.

To summarize, 556 stations have been made with scallop gear (fig. 2), and calico scallops have been found at 145 localities (fig. 3). Heaviest concentrations were off Cape San Blas, Fla., and south of Gulf Shores, Ala., in less than 20 fathoms; maximum production came from 11 fathoms. A few calico scallops were taken east-north-

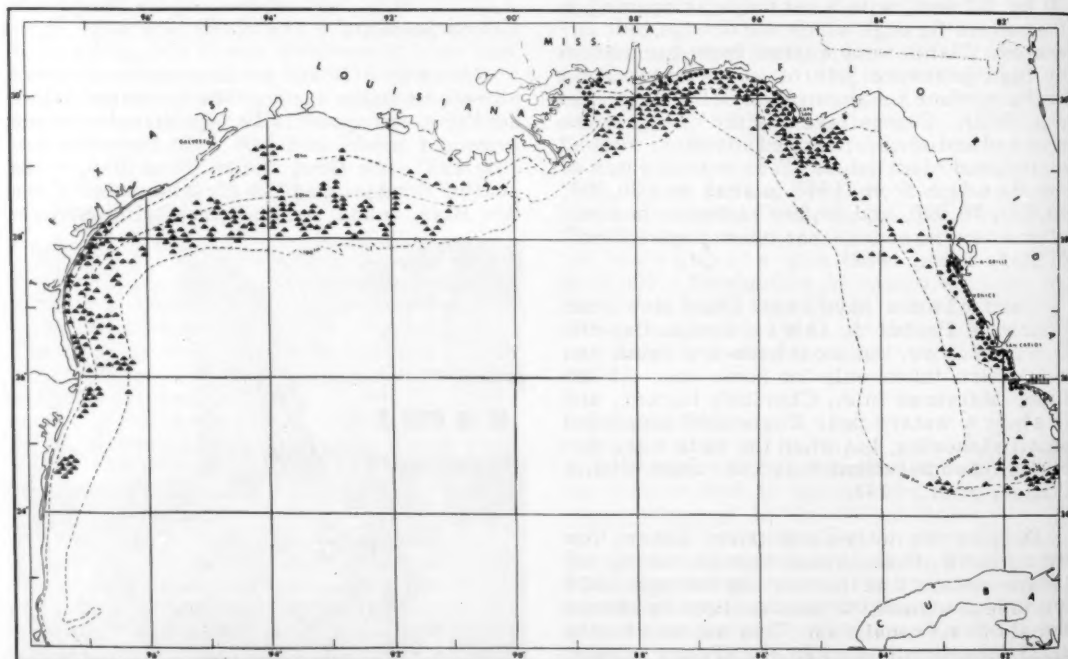


Fig. 2 - Fishing effort in the Gulf of Mexico, using scallop and clam gear, 1957-62. The triangles show where scallop gear was used and the dots where hard clam gear was fished.

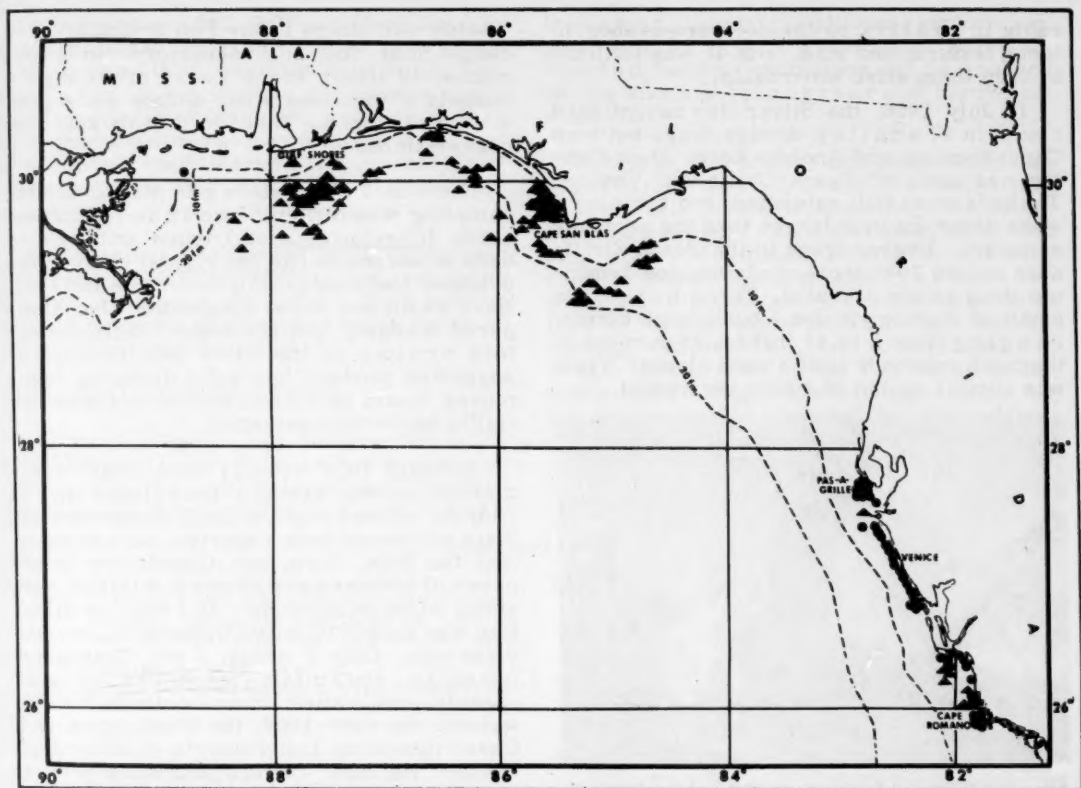


Fig. 3 - Calico scallop and hard clam occurrence in the Gulf of Mexico, 1957-62. The triangles shown where calico scallops were caught and the dots where hard clams were taken.

east of Cape Sable, Fla., south-southeast of Cameron, La., and off Galveston and Brownsville, Tex., and Laguna Madre, Mexico.

Bullis and Ingle (1959) made preliminary studies on growth rate and seasonal yield of scallops taken by commercial vessels. They found the maximum shell diameters had two well-delineated size groups that probably represent year classes. Shell sizes ranged from 0.6-1.0 inch for 1-year-olds and 1.8-2.5 inches for 2-year-olds. This indicates tentatively that scallops grow about 1 inch per year. Their study showed that scallops of commercial size have meats with about $\frac{1}{2}$ - to 1-inch diameters. It is difficult to study the growth of known scallop populations, which apparently move about. Additional studies are needed to learn more about growth rate and seasonal yield, determine seasonal availability, and to investigate the apparent movement and disappearance of well-defined concentrations from year to year.

Inshore Hard Clams

Hard clam (*Mercenaria campechiensis*) explorations have been conducted separately and with scallop explorations since 1957. Of 221 stations fished with clam gear (fig. 2), hard clams were found at 110 stations between St. Petersburg and Cape Romano, Fla. (fig. 3). The most productive beds were located off Pas-a-Grille, Venice, San Carlos, and Cape Romano. Best catches were made in 3 to 4 fathoms in the Pas-a-Grille and Venice areas in summers of 1957-58 (fig. 4). In August 1957, the Silver Bay took hard clams in 23 drags using quahog dredge between Sand Key and Gasparilla Island. The best catch (300 small clams--about 1 bushel per 30-minute drag) was confined to areas off Pas-a-Grille and Venice, Fla. Seventy percent of the catch consisted of 2-inch clams (little necks), with the remainder 3- to 4-inch cherrystones. Yield was about 1 gallon of meats per bushel. These clams were compa-

In September 1962, BCF explored for off-shore mollusks along the midshelf area of the northwestern Gulf. Between Ship Shoal, La., and Laguna Madre, Mexico, drags were made with tumbler dredges at 231 stations in 4 to 80 fathoms (table 2). The stations were set at predetermined intervals along a series of transectional legs so the 15- to 30-minute drags would provide adequate coverage.

Paper-shell scallops and small Gulf clams (*Pitaria cordata*) were taken although concentrations were generally small. Both species showed apparent preferential depth range of 21 to 50 fathoms (table 2).

FUTURE OF THE FISHERIES

Although Florida now has practically no commercial fishery for calico scallops or hard clams, BCF explorations have indicated commercial quantities of scallops in local-

ized areas. However, additional exploration, particularly in shallow-water areas, is needed before conclusions can be reached on the size and importance of hard-clam stocks.

Although the scallop and clam industries have had their ups and downs (production now is low) their future is promising. As public continues to increase consumption of sea food, price and demand for shellfish will warrant increased catches, and mechanical shuckers and eviscerators will eventually lead to reestablishment of Florida's scallop fishery. Tiller, et al., said of hard clams in 1952: "Restoration of the Ten Thousand Islands stocks might offer an opportunity for the development of a market for shucked frozen meats to be used by northern canneries, or perhaps for locally-canned clam products."

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BACTERIOLOGICAL CONTROLS FOR PRODUCING HIGH-QUALITY BREADED SEAFOODS

By Travis D. Love*

This report outlines methods, materials, and the interpretation of results that would permit the average plant technologist to provide valuable data to management on inplant bacteriological controls for breaded seafood products. These data, when properly applied, will help produce a high-quality breaded seafood product with an extended shelf life.

The Pascagoula Technology Laboratory offers a free laboratory refresher course to train the fishery plant technologist. In general, 1 week is enough to acquaint the average graduate (college) technologist or bacteriologist with the special problems and methods for inplant bacteriological controls. Training in the interpretation of results is an important part of this course.

It is essential that plant managers who wish to set up an inplant bacteriological control program employ a technologist or bacteriologist with college training in bacteriology. High school graduates may be trained to make bacteriological plate counts and other determinations; however, their work should be closely supervised by a person trained in theory and in interpretation of results. It would be wasteful to pay an inadequately trained person to use expensive materials and equipment to produce data of questionable validity.

Bacteriological Methods

Officially published methods should always be closely followed to obtain valid results. The plant bacteriologist should have these manuals for day-to-day reference:

Standard Methods for the Examination of Water and Waste Water, APHA, 12th ed., 1965.

Recommended Methods for the Microbiological Examination of Foods, APHA, 1958.

A Manual of Microbiological Methods by the Society of American Bacteriologists, McGraw-Hill Book Co., 1957, New York, N.Y.

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1/The use of brand names does not imply endorsement of a firm's products to the exclusion of other products of suitable quality.

A Manual of Determinative Bacteriology, Bergey's, 7th ed., Williams and Wilkins, Baltimore, Md.

Microbiology of Foods, Tanner, Garrad Press, Champaign, Illinois.

Our Laboratory will provide technical advice at all stages of a plant's installation of a bacteriological controls program. Pascagoula bacteriologists have prepared three papers on inplant and laboratory studies on microbiological flora of breaded frozen seafood products: Carroll, Love, Ward, and Waters (1966); Reese, Carroll, Ward, and Garrett (1966, in press); and The Proceedings of the Fresh Iced Shrimp Symposium, April 1966. These papers are free to seafood-processing plants and may be obtained on application to the Laboratory. In addition to our personnel, supervisory personnel of the USDI Fishery Products Inspection Service are also trained to provide information on installing a bacteriological controls program.

Equipment and Materials

Minimum equipment for an inplant bacteriological control program can be obtained for \$1,600-\$2,000, exclusive of laboratory furniture. The following equipment is essential to the proper performance of the necessary counts and determinations:

Microscope, monocular, with oil immersion objectives and eye piece up to 950 diameters (Figure 1).

Incubator (Figure 2).

Large pressure cooker for 15 pounds steam (Micro-matic or Presto are suitable)¹ (Figure 3).

Waring blender with 12 aluminum screw-cap, 1-quart jars. (Figure 4).

Harvard double-pan trip balance with gram weights.

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 779



Fig. 1 - Microscope.



Fig. 3 - Pressure cooker.

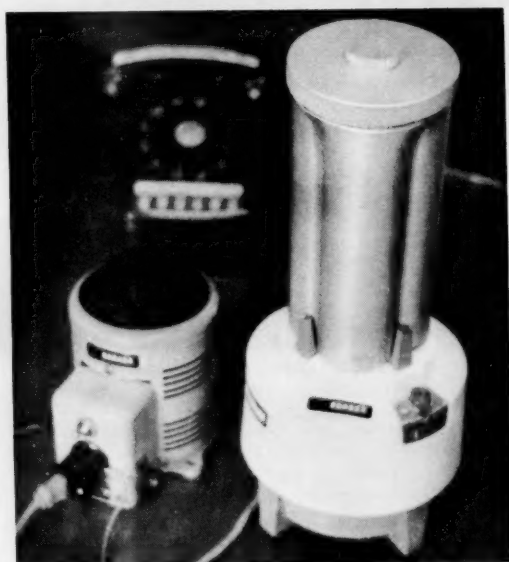


Fig. 4 - Waring blender.



Fig. 2 - Incubator.

5 dozen assorted pyrex Erlenmeyer flasks.

100 pyrex dilution bottles, 100 ml.

Quebec colony counter (Figure 5).

Refrigerator, standard, household (Figure 6).

Quick freeze, small household type.

750 test tubes, 13 mm., pyrex, screwcap (Figure 7).

Assorted small items such as microslides, inoculating loops, cotton, gauze, forceps, stains, counters, stop watch, etc.

Pipette, bacteriological, 100, graduated, 10 ml.

Petri dishes, disposable, plastic, 2 cases, 750 each.

Media, bacteriological 15 pounds assorted (Difco or BBL suitable).



Fig. 5 - Quebec colony counter.

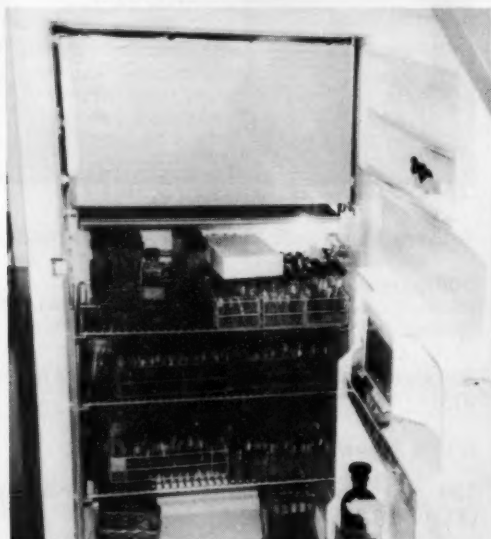


Fig. 6 - Refrigerator.



Fig. 7 - Test tubes and pipette cannisters.

The listed items can be purchased from warehouse stocks of any laboratory supply firm--such as, but not limited to, Curtin, Fischer, Sargent, or Thomas.

Interpretation of Results

One should be cautious in comparing and interpreting results of implant studies. Bacteriological counts and most-probable-numbers may vary widely because of variations in raw materials. High counts are often found in raw materials of good quality; they may influence those of the finished product.

Increases in total plate counts and the number of bacteria of public health significance should be controlled. Examination of production-line samples will pinpoint processing practices that tend to cause large increases of undesirable microorganisms.

For the average plant, a determination of total aerobic plate counts, most-probable-numbers of the coliform group, numbers of fecal types of *Escherichia coli*, and the numbers of coagulase-positive *Staphylococcus* will provide sufficient data to evaluate the processing practices and sanitation of the plant. Studies at the Pascagoula Technology Laboratory indicate that each frozen breaded seafood has its own limited microbiological flora.

Because of the increased use of bacterial counts as an index of sanitation by State and Federal regulatory agencies, it is of prime importance that plant managers control, and have data on, the bacterial flora of their products. The State and Federal regulatory agencies are discussing mandatory bacteriological standards for all frozen foods. We may find, however, that blanket standards proposed for frozen raw foods are difficult to comply with

in commercial practice. So plant managers and the Bureau of Commercial Fisheries ought to obtain data on production-line samples that

will make possible the formulation of satisfactory standards for each product.

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CANNED SALMON PLENTIFUL AND NOURISHING



Salmon has helped nourish members of the human race since prehistoric times. Today, thanks to modern canning methods, salmon is widely known as a cosmopolitan food fish. Its delicious flavor, nutritional value, and the convenience of the easy-to-store, easy-to-use can are three good reasons for serving salmon frequently, says Harold E. Crowther, Acting Director of the Department of the Interior's BCF.

A heavy catch of salmon in 1966 will result in plentiful supplies of canned salmon during the coming Lenten season.

This recipe, developed by BCF's home economists, demonstrates a simple-to-prepare canned salmon entree.

For menu suggestions and some helpful hints in serving this tasty fish, write for the popular Bureau recipe booklet, "Take a Can of Salmon." This 17-page booklet, in color, is free from the Canned Salmon Institute, 618 Second Ave., Seattle, Wash. 98104.

SALMON CHOWDER

1-pound can salmon
1 chicken bouillon cube
1 cup boiling water
 $\frac{1}{2}$ cup chopped onion
 $\frac{1}{2}$ cup chopped green pepper
1 clove garlic, finely chopped
 $\frac{1}{4}$ cup butter or other fat, melted
 $\frac{1}{3}$ cup salmon liquid

1-pound can tomatoes
1 can (8 ounces) whole-kernel corn
1 cup sliced okra (optional)
 $\frac{1}{2}$ teaspoon salt
 $\frac{1}{2}$ teaspoon thyme
Dash pepper
1 whole bay leaf

Drain salmon, reserving liquid. Break salmon into large pieces. Dissolve bouillon cube in boiling water. Cook onion, green pepper, and garlic in butter until tender. Combine all ingredients and cook for 15 minutes or until vegetables are tender. Remove bay leaf. Serves 6.

PUBLICATIONS

FISH AND WILDLIFE SERVICE

These publications are available free from the Office of Information, U. S. Fish and Wildlife Service, Washington, D. C. 20240. Publications are designated:

- CFS --Current fishery statistics of the United States.
- FFL--Reprints of reports on foreign fisheries.
- FL --Fishery leaflets.
- Sep. --Separates (reprints) from Commercial Fisheries Review.
- SSR.--Fish.--Special Scientific Reports--Fisheries (limited distribution).

Number	Title
CFS-4193--	Rhode Island Landings, March 1966 (Revised), 3 pp.
CFS-4203--	Michigan, Ohio & Wisconsin Landings, June 1966, 4 pp.
CFS-4212--	New Jersey Landings, July 1966, 3 pp.
CFS-4220--	Frozen Fishery Products, Aug. 1966, 8 pp.
CFS-4221--	Maryland Landings, July 1966, 4 pp.
CFS-4222--	Michigan, Ohio & Wisconsin Landings, July 1966, 4 pp.
CFS-4223--	Shrimp Landings, Apr. 1966 (Revised), 6 pp.
CFS-4224--	Gulf Coast Shrimp Data, Apr. 1966, 16 pp.
CFS-4235--	Shrimp Landings, May 1966, 5 pp.
CFS-4239--	California Landings, June 1966, 4 pp.
CFS-4243--	New York Landings, July 1966, 4 pp.
CFS-4244--	Maryland Landings, Aug. 1966, 4 pp.
CFS-4245--	Rhode Island Landings, June 1966, 3 pp.
CFS-4249--	Mississippi Landings, June 1966, 3 pp.
CFS-4251--	Louisiana Landings, Aug. 1966, 3 pp.
CFS-4252--	Maine Landings, July 1966, 4 pp.
CFS-4259--	Massachusetts Landings, May 1966, 9 pp.
CFS-4263--	Florida Landings, Sept. 1966, 8 pp.
CFS-4264--	Maine Landings, Aug. 1966, 4 pp.
CFS-4265--	Massachusetts Landings, June 1966, 10 pp.

CFS-4269--Shrimp Landings, June 1966, 5 pp.

Sep. No. 776--Hard-Clam Explorations Off Southeastern United States.

Sep. No. 777--Trends in Gulf of Mexico Shrimp Trawling Fleet.

FL-593--Graduate Educational Grants, Academic Year 1967-68, 5 pp., illus., Oct. 1966. The purpose of this program is to increase the number of high-caliber scientists trained for research in fisheries or in other fields relevant to fisheries. Contains information on the fields of study; stipend and duration of grant; obligations of grant tenure; and who, where, when, and how to apply. The institutions receiving awards will be required to comply with Title VI of the Civil Rights Act of 1964. Gives instructions for submitting applications, and date of announcements of awards.

SSR-Fish. No. 538--Distribution of Spawning Pink Salmon in Sashin Creek, Southeastern Alaska, and Survival of Their Progeny, by William J. McNeil, 15 pp., illus., September 1966.

Field Guide to the Synodontidae (Lizardfishes) of the Western Atlantic Ocean, by William W. Anderson et al., Circular 245, 12 pp., illus., May 1966. Illustrated keys, designed primarily for use in the field, are presented for the 3 genera and 10 species of lizardfishes, family Synodontidae, occurring in the western Atlantic Ocean.

The following Foreign Fisheries Leaflets are available free from the Branch of Foreign Fisheries, Bureau of Commercial Fisheries, Room 8015, U. S. Department of the Interior, Washington, D. C. 20240:

FFL-7--"Mexican Fisheries, 1965," discusses the principal developments in the Mexican fishing industry and foreign trade in fishery products during 1965.

FFL-22--"Republic of South Africa and Territory of South-West Africa Fisheries, 1965," consists of tables showing the production of processed fishery products for the Republic of South Africa and Mandated Territory of South-West Africa.

FFL-90--"Belgian Fishing Industry, 1965," contains information on landings; fishing grounds; derrick fishing; minimum price stabilization system; imports; exports; government policy; Benelux Union Agreement; the fishing fleet; labor; deep-freezing; outlook for 1966; and tables giving detailed fishery statistics by species and year.

FFL-103--"Japan's Fisheries Catch, 1965," summarizes Japan's fishery catch for 1956-1965; the catch of sea fisheries by type for 1961-1965; culture production for 1961-1965; and whaling for 1961-1965.

FFL-105--"Tanzania Fisheries, 1966," summarizes observations based on discussions with government fisheries officials, industry members, and others.

"Checklist of Reports issued by Branch of Foreign Fisheries (Sept. 1966)," a list of other Foreign Fishery Leaflets in this series.

Japanese Production and Exports of Marine Products, 1965. Translated excerpts from an article that appeared in the September 1966 issue of a Japanese periodical "The Cannery Journal". The report gives summary data on the production and exportation of canned salmon, canned tuna, canned crab meat, and other canned fishery products. This report is available on loan only to firms in the United States from the Branch of Foreign Fisheries.

The following publications are available only from the specific office mentioned:

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, Sept. 1966, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, sardines, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information,

Sept. 1966, 13 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Dimensions and Shapes of Larvae of Some Marine Bivalve Mollusks, by Victor L. Loosanoff et al., 84 pp., illus., printed. (Reprinted from Malacologia, vol. 4, no. 2, 1966, pp. 351-435.) U. S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn. 06460.

"Fish Farming--A Growing Industry", Fisheries Research and Services Newsletter. (U. S. Department of the Interior, BCF, 5 Research Drive, Ann Arbor, Mich. 48103.) Informs fish-farm producers, processors, buyers, and others interested in warm-water fish farming of research under way and planned by BCF and Bureau of Sport Fisheries & Wildlife. Answers queries from people now in production, those planning to enter catfish farming, and from legislators and government agencies.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, Oct. 1966, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 New Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes landings by the halibut fleet reported by the Seattle Halibut Exchange; salmon landings reported by primary receivers; landings of halibut reported by the International Pacific Halibut Commission; landings and otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and nonscheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district for the month indicated.

MISCELLANEOUS

These publications are not available from the Fish and Wildlife Service, but usually may be obtained from the organization issuing them. Correspondence regarding publications that

follow should be addressed to the respective organization or publisher mentioned. Data on prices, if readily available, are shown.

AMERICAN SAMOA:

"A Pago-Pago (Samoa)--L'Exploitation des thoniers palangriers Coreens" (At Pago-Pago (Samoa)--fishing by Korean tuna long-liners), article, France Pêche, no. 110, October 1966, pp. 36-43, illus., printed in French. A single copy 2.50 F. (about US\$0.50). France Pêche, Boîte Postale 179, Lorient, France.

AMINO ACIDS:

"Balancing of amino-acid mixtures and proteins," by A. E. Bender, article, Chemical Abstracts, vol. 64, Nov. 8, 1966, Abstract No. 7111d, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

ANGOLA:

"La pêche maritime en Angola" (The marine fisheries of Angola), by Y. Gheno, article, La Pêche Maritime, vol. 45, no. 1062, September 1966, pp. 635-640, illus., printed in French. La Pêche Maritime, 190 Boulevard Haussmann, Paris 8^e, France.

AQUATIC WEEDS:

"Aquatic weed control in Louisiana, by Virgil T. Lapham, article, Louisiana Conservationist, vol. 18, nos. 11 & 12, Nov.-Dec. 1966, pp. 2, 19-23, illus., printed. Louisiana Conservationist, Wild Life & Fisheries Bldg., 400 Royal St., New Orleans, La. 70130.

BELGIUM:

Rapport Annuel sur L'Evolution de la Flotte de Pêche (Annual Report on the Status of the Fishing Fleet in 1965), 43 pp., processed in French, 1965. Administration de la Marine et de la Navigation Interieure, Ministere des Communications et des Postes, Telegraphes et Telephones, Brussels, Belgium.

BRAZIL:

Informações à Indústria de Pesca (Information on the Fishing Industry), 1966, 79 pp., printed in Spanish. Grupo Coordenador do Desenvolvimento da Pesca/SUDENE, Documentação de Pesca, Edif. Entrepósito Federal de Pesca - 8º Andar, Cais de Santa Rita, Recife, PE., Brasil.

CANADA:

Fisheries Research Board of Canada, vol. 23, no. 10, October 1966, pp. 1475-1634, illus., printed; single copy for Canada, U. S., and Mexico C\$1.00, other countries \$1.25. Fisheries Research Board of Canada, Sir Charles Tupper Building, Ottawa 8, Canada. Contains, among others, these articles: "Muscular fatigue and mortality in haddock, Melanogrammus aeglefinus, caught by otter trawl," by F.W.H. Beamish, pp. 1507-1521; "Some methods for estimating exploited populations," by K. Radway Allen, pp. 1553-1574; "Adjustment of buoyancy in Atlantic salmon parr in relation to changing water velocity," by Nancy M. Neave, Carole L. Dilworth, J.G. Eales, and R. L. Saunders, pp. 1617-1620; "Feeding and growth of redbfish (genus Sebastes) in captivity," by A. C. Kohler, pp. 1621-1623.

International Pacific Salmon Fisheries Commission Annual Report 1965, 42 pp., illus., printed, 1966. International Pacific Salmon Fisheries Commission, New Westminster, B. C., Canada.

CANNING:

"Fluorine content in canned fish," by Jozef Wierzchowski and Barbara Wituszynska, article, Chemical Abstracts, vol. 63, Oct. 25, 1965, Abstract No. 12231b, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

CARIBBEAN:

"La pesca del bonito en el Caribe" (Caribbean bonito fishery), by Vicente Cubillas, article, Puntal, vol. XIII, no. 148, July 1966, pp. 12-15, illus., printed in Spanish, single issue 20 pesetas (about US\$0.33). Puntal, Apartado de Correos 316, Alicante, Spain.

CHARTS:

The following charts are sold by Coast and Geodetic Survey Sales agents, district offices, and the Washington office. New editions contain information essential to safe navigation--and cancel former editions. Mariners are warned against using obsolete charts.

ALASKA--Southeast Coast--Dixon Entrance to Cape St. Elias, 9th edition of Chart No. 8002 issued Aug. 22, 1966, scale of 1:969,756. Price: \$1.75 a copy.

These publications are not available from the Fish and Wildlife Service, but usually may be obtained from the organization issuing them.

ALASKA AND ALEUTIAN ISLANDS

Nautical Chart Catalog, vol. III, lists all available nautical charts for Alaska, including the Aleutian Islands, completes the conversion of Nautical Chart Catalog to new format. Similar catalogs issued this year are: Volume I--covers the Atlantic and Gulf Coasts, including Puerto Rico and the Virgin Islands; Volume II--covers the Pacific Coast, from the Mexican to the Canadian borders, and Hawaii, Guam, and American Samoa. Catalogs are accordion-folded, lists the number of all charts, areas covered, chart prices, and scale of each chart. Both small craft and conventional charts are listed. Includes list of tide tables, coast pilots (sailing directions), current tables, and tidal current charts. Authorized nautical chart sales agents are listed in the catalog.

CALIFORNIA

San Miguel Passage, 3rd edition of Chart No. 5116 issued Sept. 12, 1966, scale of 1:40,000. Price: 75 cents a copy.

San Pedro Bay, 10th edition of Chart No. 5148 issued Sept. 26, 1966, scale of 1:18,000. Price: \$1.00 a copy.

San Francisco Bay--Southern Part, 17th edition of Chart No. 5531 issued Sept. 19, 1966, scale of 1:40,000. Price: \$1.00 a copy.

San Pablo Bay, 15th edition of Chart No. 5533 issued Oct. 3, 1966, scale of 1:40,000. Price: \$1.00 a copy.

Suisun Bay, 29th edition of Chart No. 5534 issued Sept. 19, 1966, scale of 1:40,000. Price: 75 cents a copy.

FLORIDA

Crystal River to Horseshoe Point--Suwannee River, 4th edition of Chart No. 1259 issued Aug. 1, 1966, scale of 1:80,000 and 1:20,000. Price \$1.00 a copy.

St. Andrew Bay, 6th edition of Chart No. 489 issued Sept. 19, 1966, scale of 1:25,000. Price: 75 cents a copy.

Everglades National Park--Whitewater Bay, 2nd edition of Chart No. 598SC issued Oct. 8, 1966, scale of 1:50,000. Price: \$1.00 a copy.

Everglades National Park--Shark River to Lostmans River, 2nd edition of Chart No. 599SC issued Oct. 8, 1966, scale of 1:50,000. Price: \$1.00 a copy.

Intracoastal Waterway Tolomato River to Eau Gallie, 4th edition of Chart No.

843SC issued Sept. 24, 1966, scale of 1:40,000. Price: \$1.00 a copy.

Intracoastal Waterway West Palm Beach to Miami, 5th edition of Chart No. 847SC issued Sept. 10, 1966, scale of 1:40,000. Price: \$1.00 a copy.

FLORIDA--ALABAMA--Santa Rosa Sound to Dauphine Island, 2nd edition of Chart No. 872SC issued Sept. 17, 1966, scale of 1:40,000. Price: \$1.00 a copy.

GEORGIA--St. Simons Sound Brunswick Harbor and Turtle Sound, 22nd edition of Chart No. 447 issued July 18, 1966, scale of 1:40,000. Price: 50 cents a copy.

LOUISIANA

Mississippi River Delta, 18th edition of Chart No. 1272 issued Aug. 1, 1966, scale of 1:80,000. Price: \$1.00 a copy.

Chandeleur and Breton Sounds, 6th edition of Chart No. 1270 issued Sept. 12, 1966, scale of 1:80,000. Price: \$1.00 a copy.

MAINE--Calais to West Quoddy Head, 5th edition of Chart No. 801 issued Sept. 12, 1966, scale of 1:40,000. Price: \$1.00 a copy.

MAINE-NEW HAMPSHIRE--Portsmouth Harbor Cape Neddick Harbor to Isles of Shoals, 4th edition of Chart No. 211 issued Aug. 1, 1966, scale of 1:20,000 and 1:10,000. Price: \$1.00 a copy.

NORTH CAROLINA--Cape Hatteras--Wimble Shoals to Ocracoke Inlet, 12th edition of Chart No. 1232 issued Aug. 29, 1966, scale of 1:80,000. Price: \$1.00 a copy.

TEXAS--Corpus Christi Bay, 8th edition of Chart No. 523 issued July 25, 1966, scale of 1:40,000. Price: \$1.00 a copy.

WEST INDIES--Puerto Rico--East Coast--Pasaje De Vieques and Radas Roosevelt, 3rd edition of Chart No. 940 issued July 25, 1966, scale of 1:25,000. Price: \$1.00 a copy.

CRAB(S):

"Canadian Atlantic crab resources," by D. G. Wilder, article, Fisheries of Canada, vol. 19, no. 3, September 1966, pp. 11-16,

These publications are not available from the Fish and Wildlife Service, but usually may be obtained from the organization issuing them.

illus., printed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Summarizes available information on the fisheries for rock crab and spider crab in the Gulf of St. Lawrence and other crab species. Also discusses needs for further research, and examines possibilities for expanding the existing fisheries or developing new ones.

"Strong ships and hardy men harvest delicate king crab," article, *Pacific Fisherman*, vol. 63, June 1965, pp. 11-15, printed. Miller Freeman Publications, 71 Columbia St., Seattle, Wash. 98104.

DENMARK:

Fiskeriundersøgelser i 1963 ved Danmark, Faerøerne og Grønland; 1964; 1965 (Marine Fishery Research in Denmark, the Faroes and Greenland: Reports for 1963, 1964, and 1965); by E. Bertelsen and Paul M. Hansen, *Skrifter fra Danmarks Fiskeri - og Havundersøgelser* no. 24, no. 25, and no. 26; 113, 84, 112 pp., respectively, illus., printed in Danish; 1964, 1965, and 1966, respectively; Kr. 9.75 (US\$1.50) each. I Kommission Hos Andr. Fr. Høst & Son, J. Jørgensen & Co. Bogtrykkeri, Copenhagen, Denmark. The 1965 report includes sections on possible protection for the dogfish; fluctuations in the yield of the North European tuna fisheries. The 1964 report discusses fish traps in Greenland; prevention of disease in trout ponds; and bubble-curtain research. Reports contain summaries of the fisheries in the Faroe Islands; and the 1964 and 1965 reports review research on cod, salmon, and shrimp in Greenland waters.

EUROPEAN ECONOMIC COMMUNITY:

"La Commission de la C.E.E. a publié son rapport sur les principes de base pour une politique commune des pêches" (EEC publishes its report on the basic principles for a common fishery policy), by P. Schmitz, article, *La Pêche Maritime*, vol. 45, no. 1062, September 1966, pp. 623-629, printed in French. La Pêche Maritime, 190 Boulevard Haussmann, Paris 8^e, France.

ENZYMES:

"Enzymic curing of drawn fish," by Jaroslav Albrecht et al., article, *Chemical Abstracts*, vol. 60, Feb. 3, 1964, Abstract No. 3424c, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

FATTY ACIDS:

"Fatty acid changes in beef, pork, and fish after deep-fat frying in different oils," by R. A. Chung, J. A. McKay, and C. L. Ramey, article, *Food Technology*, vol. 20, May 1966, pp. 123-125, printed. The Garrard Press, 510 N. Hickory St., Champaign, Ill. 61820.

FISHERY RESEARCH:

"Fish population studies are important," by Otho D. May, Jr., article, *South Carolina Wildlife*, vol. 13, no. 4, Fall 1966, pp. 4-5, illus., printed. South Carolina Wildlife Resources Department, Box 167, Columbia, S. C. 29202.

FLORIDA:

A Field Key to the Batoid Fishes (Sawfishes, Guitarfishes, Skates and Rays) of Florida and Adjacent Waters, by Harold Wahlquist, Technical Series No. 50, 26 pp., illus., printed, July 1966. Marine Laboratory, Florida State Board of Conservation, Maritime Base, Bayboro Harbor, St. Petersburg, Fla. 33731.

FOOD AND AGRICULTURE ORGANIZATION:

Yearbook of Fishery Statistics, 1965 (Catches and Landings), vol. 20, 396 pp., illus., printed in French, Spanish, and English, 1966, US\$5.50. Food and Agriculture Organization of the United Nations, Rome, Italy. (Sold in United States by Columbia University Press, International Documents Service, 2960 Broadway, New York, N. Y. 10027.) The present issue brings up to date the world's annual statistics on fishery catches and landings by country, by species, and by major fishing areas previously published in volume 18. Data for 1965 have been added in all tables. Tables cover the catches or landings of all fish, crustaceans, molluscs, and other aquatic animals, residues and plants, made by commercial and subsistence fishermen operating in freshwater and marine areas. Mainland China remains the only fishing country with a significant catch that has not been reported since 1960.

Indo-Pacific Fisheries Council Proceedings,

11th Session, Kuala Lumpur, Malaysia, Oct. 16-31, 1964, Section II, Technical Papers, 331 pp., illus., processed in English, 1966, US\$1 (5s.). Indo-Pacific Fish-

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eries Council, FAO Regional Office for Asia and the Far East, Bangkok, Thailand. Full proceedings of the meeting consist of three sections. Section I is a "Report of the Proceedings" and Section III contains the papers read at the symposium. This section contains the technical papers on marine biology, fresh-water fish biology, fish culture, shellfish culture, craft, trawling, other fishing gear, fish processing, cooperatives, and statistics.

FREEZE-DRYING:

"Surface areas and densities of freeze-dried foods," by E. P. Berlin et al., article, Journal of Agricultural and Food Chemistry, vol. 14, January-February 1966, pp. 15-17, printed. Association of Agricultural Chemists, Box 450, Benjamin Franklin Station, Washington, D. C. 20044.

FREEZING:

"Alaskan fish freezing boom projected; could replenish U. S. fisheries," article, Quick Frozen Foods, vol. 28, Dec. 1965, pp. 131-132, 134, printed. E. W. Williams Publications, Inc., 1776 Broadway, New York, N. Y. 10019.

FROZEN FISH:

"Improvements in the thawing of frozen fish," article, Abstracts from Current Scientific and Technical Literature, vol. 18, abstract no. 1718, July 1965, p. 326, and vol. 18, abstract no. 2020, August 1965, p. 382, printed. British Food Manufacturing Research Assoc., Randalls Road, Leatherhead, Surrey, England.

FUNGI:

Observations on the Growth of the Marine Hyphomycete Varicosporina Ramulosa, by Samuel P. Meyers and Lydia Hoyo, Contribution No. 711, 7 pp., illus., printed. (Reprinted from Canadian Journal of Botany, vol. 44, 1966, pp. 1133-1140.) Institute of Marine Science, 1 Rickenbacker Causeway, Virginia Key, Miami, Fla. 33219.

GEAR:

"West coast fishermen swear by stabilizers," by Tom H. Inkster, article, National Fisherman, vol. 46, Feb. 1966, pp. 47-51, printed. Journal Publishing Co., 66 High St., Belfast, Maine 04915.

GENERAL:

Fishes of the Western North Atlantic, by William W. Anderson et al., Memoir I, Part 5, 662 pp., illus., printed, 1966, \$27.50. Sears Foundation for Marine Research, Yale University, New Haven, Conn. 06520. This book is the fifth in a series. Deals with marine fish in the North Atlantic that extends from Hudson Bay to the Amazon. The fish described in this volume are not normally encountered by the inshore fisherman or the general public and since the material presented is purely taxonomic in nature, this book is not for laymen's use. To the professional ichthyologist and other students of marine zoology, however, it will be an indispensable reference.

GRANTS:

"Sea-grant college benefits to U.S. fishery compared to agriculture's gains under land-grant act," article, Fishing Gazette, vol. 83, Apr. 1966, pp. 38, 40, 64, printed. Fishing Gazette Publishing Corp., 461 Eighth Ave., New York, N. Y. 10001.

INDIAN OCEAN:

International Indian Ocean Expedition. Collected reprints III, 993 pp., illus., printed, mostly in English with some Dutch and Russian, 1966. United Nations Educational, Scientific and Cultural Organization, Place de Fontenoy, Paris-7^e, France. Comprises reprints received by UNESCO during the second half of 1964 and throughout 1965. The papers presented in the volume are roughly grouped into four major parts: I - Marine biology; II - Marine chemistry; III - Physical oceanography; IV - Marine geology and geophysics.

INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES:

Statistical Bulletin for the Year 1964, vol. 14, 84 pp., printed, 1966. International Commission for the Northwest Atlantic Fisheries, Dartmouth, Nova Scotia, Canada. Volume 14 of the ICNAF Statistical Bulletin series presents statistical data on the fisheries carried out in 1964 in the Convention Area. In 1964, all member countries, except Italy, fished in the Convention Area and reported statistical data to the Secretariat. The statistics cover the nominal catch data (landings converted from landed weight to live weight) on an annual calendar

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year of capture basis. Part I presents revised summaries of the catch statistics for all species and for major species for the years 1952-64.

INTERNATIONAL COMMISSION ON WHALING:

Sixteenth Report of the Commission (covering the sixteenth fiscal year 1st June, 1964 to 31st May, 1965), 73 pp., illus., processed, 1966. Office of the International Whaling Commission, Whitehall Place, London, S.W. 1, England. The report refers to the Sixteenth Meeting of the Commission held in Sandefjord, Norway, June 1964, Special Meeting of the Commission held in London May 1965, and meeting of the Scientific Committee held in London June 1965, to assess the results of the 1964/65 (Antarctic) and 1964 (outside Antarctic) whaling seasons.

IRRADIATION:

"Commercialization of irradiated foods," by Robert J. McClusky, article, Food Processing/Marketing, vol. 26, Oct. 1965, pp. 53-57, printed. Putnam Publishing Co., 111 East Delaware Place, Chicago, Ill. 60611.

IRRADIATION PRESERVATION:

"Food irradiation," by David M. Varner, article, Food Engineering, vol. 37, Nov. 1965, pp. 53-57, printed. Chilton Co., Chestnut and 56th Sts., Philadelphia, Pa. 19139.

LOBSTERS:

"Easily built trap delivery device completes lobstering automation," article, National Maine Coast Fisherman, vol. 46, Dec. 1965, p. 27, printed. National Maine Coast Fisherman, 22 Main St., Camden, Maine 04843.

MARINE BIOLOGY:

The Scorpionfish Subfamily Setarchinae, Including the Genus Ectreposebastes, by William N. Eschmeyer and Bruce B. Collette, Contribution No. 677, 26 pp., illus., printed. (Reprinted from Bulletin of Marine Science, vol. 16, no. 2, June 1966, pp. 349-375.) Institute of Marine Science, 1 Rickenbacker Causeway, Virginia Key, Miami, Fla. 33219.

MARINE OILS:

"Oxidation of oils in marine products and its prevention," by Kenzo Toyama, article, Chemical Abstracts, vol. 64, Feb. 28, 1966, Abstract No. 7279e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

MARINE RESEARCH:

Current Status of Marine Research, edited by Robert M. Ingle, Special Scientific Report No. 12, 21 pp., illus., printed, Sept. 1966. Marine Laboratory, Florida State Board of Conservation, Maritime Base, Bayboro Harbor, St. Petersburg, Fla. 33731.

MARINE RESOURCES:

Marine Resources of the Atlantic Coast leaflet series, illus., printed, Oct. 1966. Ernest Mitts, Executive Director, Atlantic States Marine Fisheries Commission, 336 East College Ave., Tallahassee, Fla. 32301:

The American Lobster, Leaflet No. 5, 6 pp.

Summer Flounder--The Middle Atlantic Flatfish, Leaflet No. 6, 4 pp.

American Shad--A Springtime Delicacy, Leaflet No. 7, 4 pp.

Striped Bass, Leaflet No. 8, 4 pp.

MEDITERRANEAN SEA:

Catalogue of Names of Fishes, Molluscs and Crustaceans of Commercial Importance in the Mediterranean, compiled by Giorgio Bini, 422 pp., printed in English, 1965. Single copy 3,000 lira (US\$4.32). Vito Bianco Editore S.p.A., via in Arcione, 71, Rome, Italy. (Published by arrangement with the Food and Agriculture Organization of the United Nations). Contains over 400 illustrations of fish and marine animals with a listing of each specimen's scientific and common names in general use in each Mediterranean country. The aim is to simplify and clarify the designation of commercial fish in the Mediterranean basin.

MEXICO:

"The fishing industry--Mexico moves ahead," by Jaime H. Plenn, article, Mexican-American Review, vol. 34, no. 10, October 1966, pp. 10-14, illus., printed, single issue 5 pesos (US\$0.40). The American Chamber of Commerce of Mexico, A. C., Lucerna 78, Mexico 6, D. F.

These publications are not available from the Fish and Wildlife Service, but usually may be obtained from the organization issuing them.

NORWAY:

Articles in Fiskets Gang, vol. 52, printed in Norwegian. Fiskeridirektoratet, Radstuplass 10, Bergen, Norway:

No. 24, June 16, 1966, "Forekomst av egg og yngel av fish i vest- og nordnorske kyst- og bankfarvann våren 1965" (Occurrence of fish eggs and young in the western and northern coastal and bank areas during spring of 1965), by Olav Dragesund and Per T. Hogenstad, pp. 467-472, illus.

No. 29, July 21, 1966, "Rapport om prøvefiske etter hummer i Nordland fylke I 1964 og 1965" (A report on experimental fishing for lobsters in Nordland Province in 1964 and 1965), by Kaare R. Gundersen, pp. 562-565, illus.

No. 32, August 11, 1966, "Fiskeflaten 1965" (The fishing fleet in 1965), pp. 602-607.

No. 38, Sept. 22, 1966, "Trek fra den teknologiske utvikling i fiskerinaeringen" (Feature on technological development in the fishery industry), by Einar Sola, pp. 695-702.

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The study of the perishable section of the air cargo market is designed to show that the domestic and international markets can

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be expanded. The report examines certain key areas of the seafood industry--size, characteristics, markets, and problems--to evaluate their potential. It also evaluates possible profit to airlines if this cargo increases.

The report considers seafood a new air-cargo market that should be penetrated. It is oriented 2 to 5 years ahead--not to present situation.

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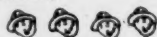
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--J. Pileggi



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